Home Access Project
Literature Review

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SECTION 4 EDUCATIONAL ACHIEVEMENT

INTRODUCTION

Programme aim and review focus

The broad objectives of the Home Access Program (HAP) are to supply home access to the Internet as an intervention to support improved learner motivation and educational attainment and parental engagement with their children's education.

The purpose of this literature review is to contribute to the design of the evaluation of HAP. In particular, to identify topics for investigating and to generate hypotheses for testing in the survey questions, the case study design, and the data analysis.

National and International research evidence of the effects of home access on education is reviewed with a focus on three areas:

- Educational outcomes and impacts relevant to home Internet access
- Cultural and familial and practical factors that are likely to influence the impact of home Internet access
- Pedagogical factors influencing the extent to which home Internet access leads to desirable educational outcomes

The findings of the review are summarised in Section 1 of this report, followed by a detailed overview of the evidence organised by the above three themes in Section 2, 3 and 4. That section concludes with a discussion which maps the key topics and hypotheses for the evaluation in Section 5. The papers reviewed are listed in the references, key papers are listed by theme in Appendix 1, and additional sources of data are supplied in Appendix 2.

Review Evidence Base

The evidence base for this review is drawn from a wide range of sources (see Appendices 1 and 2) including local, national and international empirical projects, national surveys and large scale reviews of the research literature. The scope of these materials covers multiple stakeholders and groups: government bodies, policymakers, social commentators, researchers, schools, teachers, parents, children, community groups, etc. The focus of the research is varied and covers, *inter alia*: general access to and use of technology, specific technology use in schools, at home, for leisure, learning, collaboration, communication; distributed and mobile technologies, online activities, standalone computing; modes of communication and representation; awareness and understanding of technology use, effective practice, appropriate use, contextual use, etc. Activity specific uses have focused on social mobility, impact of SES on methods of use, attitudes and perceptions towards technology; sources of support and help in the home and community. Issues explored include costs, infrastructure, sustainability, relevance, and the social and cultural aspects of technology use in the home, home-school relations.

The literature reviewed is primarily focused on the use of technologies, and while the point is made throughout that the take up and effects of technology need to be understood in relation to the social and cultural capital of those who use it, the review does not draw on the longer standing sociological literature focus on social inequity and social/cultural capital.

The quality of the data is generally high. It incorporates a mix of quantitative and qualitative approaches at local, national and international levels. A majority of the data explored is derived from empirical studies. Comprehensive reviews of the research literature contributed a useful frame and historical perspective on trends and developments in technology use, learning and home-school applications of technologies by young learners. There is a fairly even split between data obtained from quantitative, qualitative and reviews. An interesting element coming out of a cross-comparison of papers is the breadth and variety of interested stakeholders and activities: including such diverse areas as healthcare, e-commerce, creativity, political participation, librarianship, employment trajectories, etc.

Larger scale studies that the review has drawn on tend towards quantitative, survey-style data with medium and smaller scale data being derived from school-based, community and family-based studies. Survey data provides wide-ranging material and a broad overview of the landscape, whilst qualitative data provides rich, deep, specifics of interactional activity, attitudes, and perceptions at a micro level. The larger scale studies are useful but less focused on the specific issues of this review, with only a small number of those examined focusing on children and the family and technology use in the home. Smaller studies lack wide age range and few are cross-phase, with a tendency to focus on primary, secondary, FE as separate entities. In combination, however, these provide a rich general overview of activity across a wide range of areas: SES, demographic, gender, age, culture, access, activity focus, parental attitudes, parental engagement, use for learning, etc. National and International surveys and reviews tend to get published quicker with smaller scale studies sometimes taking between 2-4 years to get published. National surveys and some of the overseas resources provide a rich statistical data set. A mixture of methods are used across the resources examined: surveys and computer based testing are used in larger scale studies, with interviews, focus groups, observations, data-logging and content and narrative analysis being used in medium to small-scale studies.

Smaller qualitative studies reveal fine-grained analysis of context and background to interactional relationships with technologies that larger scale surveys miss out. A mixed methods approach would therefore seem more appropriate. Survey for breadth of participant data, more focused qualitative methods for fine-grained examination of activity and relations within the home. Many of these studies provide evidence of effects that may not be sustained at a larger scale of intervention, or indicate potential benefits, some of which are hypothetical, rather than providing proof of the causal role of technology. Thus the claims made for the benefits of technology need to be understood in this context.

There are three relevant areas that are not well represented in the literature in general and therefore within this review. These are, the motivational aspects of home use of technology, how socioeconomic and cultural factors shape the effectiveness of home use, and parents' *proactive* engagement with the school setting or formal learning being *initiated* in the home.

SECTION 1. SUMMARY OF REVIEW EVIDENCE

1.1 Conditions and actions for impact

Evidence from the research suggests that elements having a positive impact on educational achievement are linked to: high levels of parental involvement, the development of successful relationships both in the home and between home, school and other organisations, alongside sense of ownership, relevance, purpose and participation. Elements having a negative impact are linked to perceived gaps – in knowledge, time, interest, skills, confidence, support, access, relevance, safety and privacy. Ways in which these can be overcome relate to increased dialogue, consideration of wider social and cultural contexts and an understanding of factors which impact on the development of social relationships within families and communities. The conditions and actions for impact show that the intervention has the potential to benefit all households with school aged children, not only the direct beneficiaries of the programme.

1.2 Potential dimensions of impact

Overall, the evidence emerging from the research indicates that universal home Internet access if used effectively, offers potential benefits not only to the learner as an individual but also to the learning process, the learning environment, and the wider learning contexts of learners, their families and their communities. The potential benefits are, however, tempered by a range of factors that impact on their successful appropriation. Simple access and connectivity are insufficient in and of themselves and demographic variables such as age, socio-economic status, education, household composition, gender and geography have a significant impact on learners' effective use of technologies for educational purposes. In short attention to technical access needs to expand to include enabling social and cultural access and usage.

1.3 Indirect benefits to child, school and community

Online access has the potential to open up new avenues for participation, enabling users to have equity of access to services. There is evidence of the potential wider benefits of universal accesss to the Internet, however, new users and those with lower social and cultural capital require additional support. There is evidence that families are using the Internet to communicate with family members, both immediate and distant, on a regular basis, for multiple purposes – both as a monitoring (of children) and sharing (with family and friends) activity. Home access has the potential to provide greater access to public services but these need to be relevant, fit for purpose and are generally only used where there is a perceived 'fit' with user needs. Lifelong learning may also be supported by wider universal access to the Internet, but again – social and cultural capital impacts on take up and awareness of this potential in important ways. For low SES homes, issues arise around literacy, economics, lack of credit/banking facilities, etc. There is a recent trend towards online family social networking solutions.

1.4 Context of home use

Technologies may facilitate connectivity but it is people who make connections. Parents, schools, researchers and policy-makers are becoming more aware of the need to take into account social and cultural aspects of technology use and the links between children's existing and developing social and cultural capital and their ability to appropriate advantageous and effective use of digital technologies as a support for learning, identity formation and participation in wider social networks, organisations and services. Active work is required to build a community and to provide reasons for coming together, and to keep coming back to the site, to ensure that an online community succeeds.

1.5 Access and family roles

Family roles impact on parental involvement in children's learning with technologies, with mothers taking a leading role. Fathers' interests may augment where well designed and supported projects are in place for home-school links around learning. Where technology is viewed as a family resource this impacts positively on collaborative engagement, support and regulatory practices, but can impact negatively on children's ownership of, access to and interactions with the technology. Age and gender does have an impact on children's technology use, with girls' and younger children's use being monitored more than boys and older teens and regularity of use following a similar pattern. Home access to the Internet can support children to act as educators in the home, usually more in relation to adults than siblings, and from older to younger siblings. Sources of support for the use of the Internet usually extend beyond the family home and include neighbours and peers as well as extended family (relatives, grandparents, etc.)

1.6 Attitudes within home/family

Overall, parents are generally positive towards schooling and want their children to do well, though families who have had a negative experience of school as an Institution are more likely to have a negative view of schooling. The majority of parents have a positive view of technology for learning but have concerns about dangers of online activity and overuse of technology. Parents do actively monitor children's activity but this is not balanced across age and gender. Furthermore, parents often overestimate the impact of monitoring and regulation on their children's activities. People's attitudes towards and experiences of technology increases with frequency of use and dialogue between parents, children and schools. Framing of ownership does impact on perceptions and use of technologies in the home, at school and between both contexts. This may have implications for differences in the use of programme and non-programme resources.

1.7 Family knowledge and skills

Many families share knowledge and learn from each other through technology use. Often, parents and children share knowledge about technical skills, and parents support their children with formal learning, more usually mothers than fathers. Older siblings tend to support younger children. Older children and boys are less likely to admit to having help from parents. Some parents, but mainly mothers, indicate a desire for further training to improve skills so they can better support their children's learning. Parents often help children contextualise and extend their learning through feedback and praise. Fathers are more likely to assist with 'hard' skills (technical issues) and mothers with 'soft' skills (managing information). When technology is available in the home, most family members are involved in its use in some form. Children help parents with peripherals, e.g. digital cameras.

1.8 Use and activities

When and where a technology is used is a key factor in how it is used and what it is used to do, and this is strongly mediated by social class and other social factors. There is a dichotomy between home and school use of technologies when it comes to more formal learning activity and parents, schools and learners have difficulty in mapping school-based pedagogies across contexts. Home use of technology tends to be more focused on leisure and entertainment, and attempts at a hybrid response in the form of 'edutainment' regularly fail. Lower SES children are more likely to use home technology for entertainment and more likely to use home technology without adult supervision. Appropirate educational use identified in the literature most often occurs where there is open, regular and effective dialogue/support between home and school. One area where this is most likely to occur is in the use of homework that is legitimised both in school and at home as a formal learning activity. Effective home-school support networks can result in greater parental engagement in children's learning with technology. Many parents do want to do more to help children and to learn more about appropriate, effective technology use. Schools and local community networks are best placed to do this. Recent

concerns relate to critical use of technologies and parents are bringing this up as a central issue for concern. One of the wider benefits of the programme may be to push these concerns onto the school agenda. Concurrently, key research is focussing on literacy practices and identifying key themes and methods of improving children's media literacies in the home and beyond, this issue is important for all in the context of universal access.

1.9 Children's autonomy in the home and family

Children's autonomy takes a variety of forms, ranging from opportunities of access to technology and opportunities for independent action. Levels of autonomy are impacted on by parental and self-regulation as well as age, gender, physical location and socio-demographic factors. There is a potential mismatch in parental and children's perceptions of autonomous action between regulatory approaches and support, particularly in terms of more formal learning (coursework and homework) and age.

1.10 Practical issues

Successful appropriation of technology in the home requires consideration of a range of social issues, but also a number of practical issues around costs, utility, reliability, quality, durability, sustainability, integration, technical know-how and adoption support networks.

1.11 Educational achievement

Schools, teachers, parents and students would benefit from greater contextual awareness of their inter-relationships and inter-dependencies in relation to learning with technologies. This may require new pedagogies, new models of activity and new perspectives on learning as a continuum model. Achievement, above all, is linked to the notion of critical awareness and the development of learners' social, educational and cultural capital.

1.12 School-home relations and information flow

A number of government initiatives are in place to facilitate technology-mediated communication between home and school, including provision of universal access, parental engagement, real-time reporting and use of VLEs in schools. These generate a wide range of issues for parents and schools and, in particular, require high levels of commitment, technical, pedagogical and contextual support for parents, teachers and children. Much of this support, both technical and pedagogica, will need to come from schools. Context awareness, development of social, cultural and educational capital and effective design of resources is needed. Families need support in negotiating pedagogical contexts and help in ascertaining what constitutes effective educational use of technology. More research is needed on how technology can be used to facilitate learning in the home, both in school-related contexts and a home-based contexts.

1.13 Teacher attitudes and knowledge

Teachers generally have a positive attitude towards technology use in the classroom, although they can struggle to apply this in practice due to constraints of time, confidence, or skills gaps. They believe ICT is motivational, important in supporting learner's future career prospects and in contextualising school-based learning and real-world settings. Teachers use technologies for a wide range of activities – to teach, present, support learning activity. Teachers generally appear to have a good knowledge of online resources, particularly in their own subject areas; some are less familiar, however, with newer, participatory technologies and their potentials for learner-generated content and collaborative work.

Technology has the potential to work well when it is properly planned, situated and contextualised; where relevant training is provided and where users (teachers, parents, students) have some say in how such use is implemented.

1.14 Formal and non-formal learning

Informal and non-formal learning such as leisure activities and interests can provide a bridge to formal education through voluntary accreditation, e.g. through award schemes like ASDAN, the Arts Award and through personal interests such as sports or other hobbies. These can support learners to develop confidence and self-esteem in areas motivated by personal interest and formative feedback from parents, peers and mentors rather than summative feedback from authoritative bodies. Universal Internet access would mean, children accessing more kinds of content online and the convergence of content and a wide array of digital devices may contribute to alternative channels of communication and collaborative networks for this type of activity. Online networks can be safeguarded through a 'walled garden' approach. Design of online content needs to be creative and flexible and appropriate for learners and parents, participatory design and/or a 'bottom-up' approach may assist with this. The growth of content aggregation through the 'personal web' facilitates the idea of the school as a hub for collaboration, both on and offline, as a source of knowledge, support and linking between families, individuals, community groups and other organisations. Barriers to this model are time, expertise, costs and existing narrowly framed cultural contexts which operate on a 'closed' rather than a 'open' model and the potential for low uptake of home-school dialogues.

SECTION 2. REVIEW OF EDUCATIONAL OUTCOMES AND IMPACTS

2.1 Introduction and key messages

This section focuses on the potential educational outcomes and impacts of home Internet access. It highlights the conditions and actions likely to support positive impacts and sketches the conditions that are likely to reduce the likelihood of a positive impact (challenges and barriers). The potential dimensions of impact of home Internet access are outlined with respect to learners, learning and a range of skills including personal, social and communication skills, as well as the home as an environment for learning and effects on parents/carers. The indirect benefits of home Internet access for children, families and communities are highlighted.

2.1.1 Key messages: conditions and actions for potential impact

E*lements having a positive impact* on educational achievement are linked to:

- Positive parental views of children's technology use
- High levels of parental involvement and support
- The development of successful relationships both in the home and between home and school and other organisations
- Clear learning focus and activities
- Creating ownership, relevance, purpose and participation

Elements having a negative impact are linked to:

- Perceived gaps in parental knowledge, interest, skills, confidence, support, access, relevance
- Technophobic parents or negative parental views of children's use of technology
- Poor communication between home and school
- Parental concerns re safety and privacy
- Competition for shared resources
- Inadequate learning resources
- Technical issues and lack of ongoing technical support

Ways in which *these can be overcome* relate to:

- Increased dialogue between home and school
- Mechanisms to provide safe and secure environments
- Support and information for parents on safety and privacy
- Consideration of wider social and cultural contexts of technology use
- Change of focus from access to technology to use for learning: simple access and connectivity are not sufficient in and of themselves
- Community networks or 'digital champions' and schools can better support low socio-economic families to use the Internet more effectively
- Provision of ICT training and support to families is likely to increase parental support in the home

2.1.2 Key messages: Potential dimensions of impact

- Demographic variables impact significantly on learners' effective use of technologies for educational purposes
- Potential benefits for the learner and to their families and their communities:

    - Learner motivation
    - Independent and personalised learning
    - Development of social skills
    - Repertoire of personal communication and collaborative skills
    - Development of information seeking and evaluation skills
    - Critical thinking skills
    - Improved ICT technological skills and confidence
    - Increased networks both social and educational
- If schools are proactive, potential benefits for continuity between home and school in relation to home school relations, attendance and school work
- May increase time spent on learning activities (broadly conceived)

2.1.3 Key messages: Potential indirect benefits to child, school and community

- May assist younger people's civic participation and e-democracy
- May contribute to parental literacy
- May support access to employment opportunities online
- May contribute to family financial management although this is difficult and less likely for families with low social and cultural capital
- Access to information and services, although less likely for low socio-economic families
- Those families who could most benefit from e-shopping etc, are held back by low literacy, numeracy and lack of credit

2.2 Conditions and actions for impact

In a recent US study (Jackson et al., 2006) on home Internet use, home computers were supplied to low SES families of children aged 10-18 years. Jackson et al. reported a **positive impact on academic achievement** and associated higher Internet use with improved GPAs and reading scores. They also suggested that academic performance enhancement is greater for low-income children than for others. In a similar study in the UK (Passey, 2007) teachers reported pupils worked more independently and accessed school work from home and attainment outcomes shifted upwards.

The literature suggests that **parental attitudes to technology use in home** also exert a positive impact on parents and students view of technologies as useful, convenient learning tools, and parents see technology as providing rich learning resources that enhance children's interest in self-directed learning (Kong and Lia, 2009). In the CiTH (Computer in the Home) project, for example, parents welcomed the opportunity to make use of technology to support family activities and children's learning (Passey, 2007).

Parental attitude to use of technology to support learning is more positive where there is a **clear learning focus**, such as homework or a school-mediated project (Kerawalla and Crook, 2002), where **information on class-based activities is shared** with parents in a way that they can easily understand and build on (Kerawalla et al., 2007) and learning is connected to real-world or personalised learning contexts (Roschelle et al., 2000; Selwyn, 2007).

In a Greek study on children's home internet use, **parental support** was identified as a key factor in **frequency of use, activity variety, and students' self-efficacy and value beliefs** (Vekiri and Chronakib, 2008). Similar findings were reported by Lee (2008) in relation to young people's uptake of opportunities afforded by Internet use in the UK.

A recent Hong Kong study (Kong and Lia, 2009) on effective literacy underscored the **importance of school as a support network** in supporting parents' interactions with their children in relation to their technology use. And in common with and other studies conducted in Israel and the US (Telem and Pinto, 2006; Unal, 2008) point to the need for the development of **meaningful home-school relationships** which focus on the **dialogic and contextualised relations** between schools, parents and children as a learning triangle which itself operates within **wider social and cultural contexts**.

In terms of administration and successful connectivity, the CiTH project (Passey, 2007) revealed that **involvement of the wider community** contributes much to successful outcomes. So far as 'within home/family' aspects are concerned, where technology was **used as a family resource in a central location**, this impacted positively on collaborative learning, two-way learning between children and adults and more focused use for learning and homework (Kerawalla and Crook, 2002; Passey, 2007). Such shared use can also, however, have a negative impact (see below).

2.2.1 Condition likely to reduce the likelihood of a positive impact

Technophobic parents with **negative perceptions of technology** can impact negatively on children's computer use. Such parents may fear that children will be distracted by game play, spend too much time online, make inappropriate contacts with strangers, access inappropriate content, etc. (Kong and Lia, 2009).

Other conditions that are likely to reduce the potential positive impact of the program include parents' ***lack*** **of knowledge, time, interest, enthusiasm and confidence** with respect to technologies in general and technologies for learning in particular. Parents may not know enough about the **pedagogical context** (Kerawalla and Crook, 2002; Buckingham, 2006; Kerawalla et al., 2007) and may lack confidence as a result, especially less well-educated parents (Venegas, 2006; Bradbrook et al., 2008; Lee, 2008) whilst others focus on lack of awareness in how to conduct effective use of technologies (Venegas, 2006).

Kerewalla and Crook (2002) cite **competition for share access to resources** as a potential difficulty, with family members having a **perceived lack of ownership**, occasion for **sibling rivalry** and **parental use taking priority**.

Inadequacy or tedium of learning resources is another factor impacting on reduced impact (Kerawalla and Crook, 2002; Buckingham, 2006; Kerawalla et al., 2007) with parents unsure as to what makes effective educational use.

Technical issues and **lack of ongoing support** or knowledge in dealing with these also has the potential to impact negatively on home use of technologies (Boulton, 2008).

2.2.2 Schools' risk avoidance and strategies for dealing with risk

Schools and teachers often perceive that it is the role of **parents to monitor children's use of the Internet** and help them develop the right online learning attitude. Although limited, access to internet brings with it potential dangers and harm through exposure to pornography, gambling sites, race-hate sites and paedophiles, bullying – **risks may be more severe for disadvantaged young people** where parental expertise may be insufficient to ensure their safety (Bradbrook et al., 2008).

Schools take a variety of approaches to **encourage parental involvement in risk avoidance and management.** These include **improved home-school communication and information sharing** using technologies (Livingstone and Bober, 2006; Kong and Lia, 2009); within a broader **policy of parental engagement and shared responsibility** for accommodating risk, including **information sharing, culture of open communication**. Some schools offer parents **information packs** and

workshops to inform parents also (Kong and Lia, 2009), providing **materials on ethics, privacy, e-safety**, **Internet policies**. Some schools and communities facilitate parental and community **self-help groups** encouraging development of **civic participation** in young people (Krumsvik, 2006; Passey, 2007; Selwyn, 2007; Kong and Lia, 2009) and support family members in understanding the wider contexts/opportunities of technology use (Passey, 2007; Bradbrook et al., 2008)

Taking a more technical approach to risk management, some schools make **use of filtering and walled gardens** although these can also limit positive ICT opportunities (Hope, 2008). While others argue for the need to **change focus** from simple access to learning, and technological solutions to focus on literacy and critical awareness as a part of risk management for children (Selwyn, 2007).

2.3 Potential dimensions of impact

2.3.1 Personal and social skills

Increased motivation is associated with the use of technologies, although what this actually means for learning is contested. Studies by Valentine et al. (2005) and Passey et al. (2004) found that ICT in schools has the potential to motivate disaffected pupils (Bradbrook et al., 2008). While other studies suggest that ICT stimulates learner motivation and engagement particularly for learners with behavioural, emotional and social difficulties (Russell and McGuigan, 2008).

Personal skills are seen as a significant potential area that the use of technology can enhance through the development of technological fluency (Dorr and Besser, 2003) it is argued that social and cultural capital relevant to the information age can be developed (Selwyn, 2007; Lee, 2008). Technology is also seen as key to the development of learner identity through social interaction with peers (Boyd, 2007) and communities of interest (Gee, 2004a) around shared 'affinity spaces'. While contested, these are seen as contributing to increased self-esteem, self-efficacy and independence (Livingstone and Helsper, 2007; Dodge et al., 2008; Vekiri and Chronakib, 2008) and support gaining access to information on personal interests, needs, support networks, etc. in relation to learning, health, career, etc. (Passey, 2007; Bradbrook et al., 2008).

Social skills are highlighted as another key area of potential impact from the programme. Particular social skills that the literature suggests can be potentially enhanced by the effective use of technology include: negotiating social networks at a local, national and global level (Boyd, 2007; Bradbrook et al., 2008); improving social skills through collaborative and co-operative learning; developing awareness of issues around privacy, ethics, safety, ownership, respect for others, time management (Kong and Lia, 2009). These skills among others are seen to contribute to developing a sense of cultural competency that supports young people in negotiating public/private life spaces effectively (Locke, 2007; Selwyn, 2007; Lee, 2008). In addition, ICT can be used as a social and cultural tool for sharing information and experiences through peer-to-peer networking and communities of interest, for example, making and maintaining friendships or developing a knowledge around a particular hobby or interest (Bradbrook et al., 2008).

2.3.2 Benefits for developing communication skills

The literature points to a **diverse range of opportunities and forms for communicating** that are supported by universal access to the Internet. These include email, instant messaging, chatrooms, social networks, access to a host of images, video, animation, and simulations. The potential opening up of communicative spaces for individual, social, collaborative, and cooperative communication (and learning) in both synchronous and asynchronous contexts is provided by the Internet. While the benefits of these are multiple, its effect on learning and performance is not clear, although some students note that students with their own home e-mail address increase average performance by 2.4 score points (on a scale of 1–36) (Kuhlemeier and Hemker, 2007) it is unclear if the variables for social class and wealth are

adequately accounted for in this study.

Technologies appear to provide **increased opportunities for dialogue** between parents, teachers, siblings, peers and extended family member around technology use, learning, interests, real world scenarios (Pain, 2008). They also provide potential opportunities for **digital Authoring:** written, visual, audio, video, sense of audience; participatory culture – in which students can be both the consumers and producers of content (Erstad, Gilje and de Lange, 2007; Gee, 2007). The extent to which children move beyond consumption, or creative consumption to become full producers of information is questioned by Livingstone et al (2007) and others. Livingstone et al. (2007) suggest that **learners' engagement with technology is a "staged process"** which passes through **4 stages of development** the longer learners engage with a technology: ***basic users*** who focus on information-seeking, ***moderate users*** who progress to information, entertainment and communication; ***broad users*** who add instant messaging, music downloading and peer-to-peer networking to their repertoire; and ***all rounders*** who perform a wide range of interactive and creative uses.

A broader Skills Set for technologies is identified in the literature, for example Green and Hannon (2007) identify a **set of soft skills** (recognised by teachers, parents, academics and children) that ICT supports: communication, general knowledge, creativity, collaboration, self-esteem, parallel processing, persistence, peer-to-peer learning, risk-taking, multitasking, logical thinking, problem-solving, trial and error learning, hand-eye co-ordination, technical confidence and content creation.

2.3.3 Benefits for developing critical thinking skills

The literature identifies a number of benefits of Internet access for critical thinking skills. This includes notions that **Transform learning** from a matter of acquisition, to learners as researchers, learners as teachers and places emphasis on problem-solving and real-world scenarios, virtual worlds and blended learning communities (Pearson and Somekh, 2006; Craft, Chappell and Twining, 2008). Links between technologies and i**mproved cognitive skills** are also made in the literature in which the use of technologies are seen to enhance visual, spatial, iconic and representation skills, especially through gaming and simulation activities (Jackson et al., 2006). Lomas et al. (2007) point to the increasing complexity of digital information networks and stating that **'information literacy is not a given'** they argue that the **skills of critical thinking, research, and evaluation are increasingly required** to make sense of the world. Further, others argue that it is not **just learners, but also their parents** who need support in developing a critical awareness of new technologies and their potentials (Kong and Lia, 2009) and that this is **supported by increased opportunities for home-school dialogue mediated by technology** use.

2.3.4 Benefits for developing independent learning in home and school

Home access to technology facilitates a range of flexible choices, in which the multiple modes for learning, learner choice, and learner voice provide opportunities for a variety of learning styles including self-directed, collaborative, co-operative, social, personal, individual and group learning across multiple contexts (Kerawalla et al., 2007; Bradbrook et al., 2008). **Flexible time, space and content** are seen to underlie the development of **effective technology-mediated home-school relationships allows for continuity of learning between home and school** (Kerawalla et al., 2007). The blended use of school-mediated and online resources provides a rich variety of learning resources (Kong and Lia, 2009), flexibility, opportunities for increased learner relevance, interest and motivation, access to real world scenarios, personalisation of materials and accessibility (Pearson and Somekh, 2006). Selwyn (2007) echoing earlier commentary on irrelevant and uninteresting educational content (Kerawalla and Crook, 2002) argues that **we should not assume 'one size fits all'** (Valentine, Marsh and Pattie, 2005) and, on the contrary, **encouraging learners to produce their own content for learning is desirable**.

2.3.5 Benefits for developing information seeking and evaluation skills

Key benefits for developing information seeking and evaluation skills include the ways in which the Internet enables access to wide and varied set of resources. With appropriate support (from teachers, peers, parents, others) this can **enable learners to target specific interests and identify types/genres of resource** (Venegas, 2006). The Internet can be used to **find useful information about health, careers, civic participation**, (Porter and Donthu, 2006; Bradbrook et al., 2008; Pain, 2008) learning, further and higher education. In other words, the technology combined with **real needs facilitate enhanced skills, and greater use leads to increased skills** (Porter and Donthu, 2006; Jackson et al., 2007; Livingstone and Helsper, 2007).

In a Hong Kong study on information literacies, parents felt children were capable of searching and selecting information and self-evaluating outcomes (Kong and Lia, 2009). A series of studies suggested that **young people's evaluation skills were most successful where the activity was self-directed and related to personal interests** rather than the **gathering of formal information in which cases they showed a lack of criticality, patience and were quickly frustrated** by lack of easy answers (Selwyn, 2007). The **ability to find useful information is seen as a source of social and cultural capital** (Lee, 2008) although it is important to highlight that functional expertise does not, however, equate to the critical literacies required to interpret, understand, critique and manage that information (Selwyn, 2007).

2.3.6 Benefits for developing attendance

Shared use of SIMs can, the literature notes, **promote regular, rapid, reporting between home-school**. This has been linked to an ability to communicate easily between home-school, along with the use of other technology devices, e.g. mobile phones/texting to communicate with parents and use of integrated technologies such as digital registers, and the practice of generating LAB (learning, attitude, behaviour) reports by multiple teachers (and not just the form teacher)has **increased parental agency, motivation, engagement and take up of responsibility** (Telem and Pinto, 2006). The potential for a **reduction in truancy rates** is linked with text messaging to alert parents about truancy which seems to be having an impact, with Scottish schools reporting reductions of as much as 27% and Bilton High School, Warwickshire reporting a 39% reduction (Bradbrook et al., 2008).

2.3.7 Benefits for developing access to information

Positive parental engagement with schools via shared SIMs (Telem and Pinto, 2006); regular access and updating of VLEs, school websites (front-ends), sharing of email, texts, online newsletters, calendars, etc. (Unal, 2008) has clear benefits for sharing and accessing information, as noted above. It also has the potential to lead to **increased and relevant networking opportunities** and the development of cluster communities (schools, youth networks, community networks, etc.) (Bradbrook et al., 2008; Pain, 2008). This in turn can support i**ncreased information literacy and family dialogue** about education via parental access to personal, social, community, educational, interest-led information for all family members – and access to shared resources that may promote home dialogue, develop relationships between students, parents, and peers (Passey, 2007).

2.3.8 Benefits for inclusion

Increased opportunities for communication, networking, involvement of parents, children and support networks (Jackson et al., 2007) associated with universal home access, can also involve children and young adults in ownership of learning. Some research suggests that this can support the **development of individual as part of a learning/social community** (Passey, 2007; Bradbrook et al., 2008) and the **stepped development of learner – across multiple contexts** (home, school, support

networks)(Kerawalla et al., 2007; Livingstone and Helsper, 2007).

2.3.9 Time spent engaged in learning

The research evidence overall supports the view that **learners typically use technologies more at home, and with greater freedom, variety and purpose, though often less for learning than leisure** (Kerawalla and Crook, 2002; Livingstone and Helsper, 2007; Luckin et al., 2008; OfCom, 2008). Access is regular compared to intermittent school access, and home access to technology promotes continuity between home and school, most commonly in its potential use for formal learning is for homework. Home access has the potential to provide learners with more time to learn online, but also more freedom in what and how they learn. Universal home access has the potential to **free learners up from restrictions of timetabling**, increasing learner motivation and interest, and to potentially facilitate deeper engagement, greater exploration and build **links between real world learning and curricular learning** (Clark et al., 2009). Conversely, home learning for others **can involve fitting study periods into available times and spaces concomitant with family life** (Kirkwood, 2000; Boulton, 2008).

Learner agency and motivation it is argued is increased by supporting learner input into content/process (Selwyn, 2007) and increasing the perceived relevance of learning (Kerawalla and Crook, 2002) and the ease of use of the Internet (Kerawalla et al., 2007) and access to content has the broader potential to impact on the amount of time spent on learning.

The q**uality of relationships between home-school and parent-child relationships are mutually supportive, and where these are high the time spent engaged in learning increases**. School support (in the form of shared resources, information and training) for formal learning in the home facilitates increased time spent on learning (Kerawalla et al., 2007). How people spend time on the Internet is however strongly effected by **age differences** which **impact on time spent on the Internet** with younger children spending less time online than older children (12-19); and 12-15 year olds make broader use than those aged 8 to 11 (Bilagher and Madhavan, 2007; Livingstone and Helsper, 2007).

2.3.10 Environment for learning (parents/carers/family members as learners)

In the Computers in the Home Pilot (Passey, 2007) there was evidence that **home access to technology promoted its use as a shared family resource** with each computer in the home being accessed by up to eight users from pre-schoolers to grandparents. **Learners supported parents in acquisition of technical skills, learners benefited from dialogue/interactions with extended family members** around technology use. Strong support networks in school and community strengthened technology use in the home.

Attitudes to/experiences of learning with technology vary significantly with age, gender, work and experience (Porter and Donthu, 2006) while Lee (2008) points to socio-demographic heritage as having a significant impact on uptake of technologies for learning in the home. The available time, and constraints and demands on parental time make a difference to how the Internet access is used for learning. **Many adults cite lack of time as a barrier** (Kerawalla and Crook, 2002) to helping their children at home, whereas for those who do have time, issues other than simple access can have a significant impact, e.g. lack of skills, confidence, self-esteem, social connectivity (Bradbrook et al., 2008); role of parent/carer in the home makes a difference.

2.3.11 Improved ICT skills/confidence

In a Hong Kong study (Kong and Lia, 2009) on information literacy practices between home and school, parents' **ICT skills and confidence levels were positively impacted on through home**

school relationships and mutual sharing of information, a specific framework for learning with ICT and opportunities for dialogue and training around ICT use.

The ability of parents to support their children's use of ICT varied widely according to whether they had developed ICT skills through training courses or using computers in their own occupations; need for schools to recognise that digital divides in relation to parental skills levels to support home use of ICT are as, if not more important than access to ICT hardware at home. As such **schools need to provide more ICT training and support for parents and the wider community** (see below) (Valentine, Marsh and Pattie, 2005)

2.3.12 Effect on parents/carers

When used, the Internet and technologies **can improve literacy, can learn with/through children** (Pain, 2008) but they can also have negative impact with some parents reluctant to engage (Bradbrook et al., 2008). Parental training and literacy learning often **works best when it is embedded in the wider school, and community networks** (OfSted, 2007). In particular programmes stand a **greater chance of success where disadvantaged/minority groups have additional support networks**, e.g. second language learners have access to bilingual resources, others to special interest groups (single parents, hobbies, etc.) (Passey, 2007; Bradbrook et al., 2008).

Home access has been shown to have some effect in certain communities, where additional support in the form of community networks is also in place. For example in the Computers in the Home project (Passey, 2007), the input of schools, community workers and the provision of a mobile ICT bus had a positive impact on parent/carers/young adult siblings take up of opportunities mediated by technology. Making the important point that **take up is more likely to be successful when integrated with existing social networks and cultural communities** (Passey, 2007; Selwyn, 2007; Bradbrook et al., 2008).

The research evidence suggests that home access to technology does result in an increased interest and awareness of the relevance of technology as a support for education and lifelong learning (Passey, 2007). It also effects on how schools are viewed by many parents, **schools are seen as less distant, and this is seen as bringing educational outcomes closer to home, and fostering opportunities for greater parental engagement** in educational outcomes. It needs more than just technology support, however – **schools need to be proactive** in supporting parents (Telem and Pinto, 2006; Kerawalla et al., 2007; Kong and Lia, 2009). These potential positive impacts are greater for some communities than others (increased interest in ethnic communities, for example) and may be dependent on general attitudes/experience of education and levels of support available to raise parents/carers' to a new level (Passey, 2007; Bradbrook et al., 2008; Pain, 2008).

2.4 Indirect benefits to child, school and community

2.4.1 Family finance management

Whilst more **affluent families use the Internet for complex financial** transactions (banking, stocks and shares) (Lee, 2008) **this is not the case for lower SES homes**. A USA study on students' use of online services to secure funding for further education revealed that **use of formal information sources**, requiring online registration, data input, understanding of particular knowledge domains (e.g. financial aid) and sharing of personal information **can be difficult for families and children with low social and cultural capital** and **some parents may resist requirements to share personal** data online (Venegas, 2006).

Bradbrook et al. (2008) suggest that **home Internet technology use can increase financial capital by giving access to cheaper goods and services**. However, McMeekin et al. (1999) report that even with policy initiatives aimed at poorer SES groups, their shares in e-commerce transactions were relatively low, a factor explained as being linked not only to lack of access but also to low **literacy, numeracy and access to credit means that those who most need extra provision are least able to access it by e-shopping** (Dennis et al., 2007).

A UK study on attitudes to and participation in **e-democracy** (Gibson, Lusoli and Ward, 2005) reports **higher levels of participation online** compared to offline and suggest that some users (younger and higher SES) find online participation easier or preferable. They also cite **use of SMS and other offline media to promote extended participation**.

2.4.2 Communication and integration of family in local and global networks

Recent media reports suggest that the **next wave of social network developments**[1] **will be targeted specifically at families** (Barghava, 2007; Goldie, 2008), focussing on **sharing news, photos, videos, events, diaries and even genealogy**. Others report on the increased development of specialist social **networks for particular interest groups based around family, religion and other interests** (Agarwal, 2008). In an interesting article from the US, one father talks of his changing experiences through use of social media from 'social media idiot' to 'social media expert' and cites **increased contact with family and friends** – on a daily basis (Biser, 2008). A key area of use, according to a recent DIUS poll, is **between parents and children at university, with 78% of parents suggesting that new technologies such as SMS text messaging, Skype and Facebook have made it easier for them to communicate with their student children** (Khan, 2009). Other groups regularly using such media are those with extended families overseas, e.g. military personnel, émigrés, immigrants, missionaries.

2.4.3 Effect on parents/carers' access to public services

Bradbrook et al. (2008) cite the benefits of home internet access in relation to **increased access to public services online** (health, education, jobs, local networks, civic participation, etc.). However, such information is likely to be **less accessible to lower SES homes with low levels of existing social and cultural capital** (Selwyn, 2007; Lee, 2008). This may be overcome with well-developed **community networks or 'digital champions'** (Passey, 2007) or **through children and schools**.

A US study on the impact of free Internet TV in homes revealed that **increased access** and opportunity **does not equate to wholesale use of services** (Laudemana, Youtieb and Shapirac, 2005).

An Australian study on the impact of egovernment initiatives (Dugdale et al., 2005) reports that **services work best when focused on relevant needs and priorities of users**, who **may need assistance accessing materials** suggests that **use of an 'Internet advocate' and community-driven support networks** may assist in engaging low users and developing IT literacies.

2.4.4 Access to online courses

Long term development of skills in using the Internet is is **dependent on appropriate and accessible forms of ICT being made available** to community members. The provision of mobile ICT facilities (on a bus) increased ICT access for some community members and this was significant for some.

[1] e.g. http://famiva.com, http://www.famster.com/ , http://www.familycrossings.com

Broadband centres have also contributed to **widened access and opportunity (taster courses, qualifications) but not all adults could visit them** (Passey, 2007).

In the Computers in the Home project (Passey, 2007) parents were able to access employment opportunities online, to engage with relevant networks (e.g. ethnic or other minority communities) and to work flexibly from home – one mother, for example, obtained employment as a bilingual interpreter (Pain, 2008).

SECTION 3. REVIEW OF CULTURAL, FAMILIAL AND PRACTICAL INFLUENCES

3.1 Introduction and key messages

This section examines the literature on the possible factors that may influence the extent to which home Internet access can lead to desirable educational outcomes. It covers the context of home use including the networks and communities for learning within the home. It outlines the different issues of access and family roles, including attitudes to technology within the home including issues of safety, parental monitoring of Internet use, and children's autonomy with respect to Internet use. Family knowledge and skills, and the activities and uses of technology and the Internet in the home as well as more practical issues of such as technological support are also sketched in this section.

3.1.1 Key messages: Context of home use

- Social and cultural aspects of technology use are key to home use of Internet and digital inclusion
- Existing social capital is key to people's ability to use technology appropriately for learning
- Technologies may facilitate connectivity but it is people who make connections
- Active work is required to build a community and ensure it succeeds
- The physical location of the technology is key to how it will be used
- Technologies placed in shared social spaces are likely to promote multiple uses by multiple users
- When technologies are placed in shared social spaces learners have to compete for use
- Placing technology in a learner's bedroom is likely to reduce social interaction around computer and offer less opportunity to monitor use and content
- Low SE homes are more likely to locate technologies in a child's bedroom

3.1.2 Key messages: Access and family roles

- Mothers tend to take a leading role in homework support
- Fathers' interests may be increased by projects for home-school links around learning
- Girls' and younger children's Internet use is monitored more than boys and older teens and regularity of use following a similar pattern
- Home access has the potential to enable children to act as educators in the home, more in relation to adults than siblings
- Older teens have more private access to the Internet
- Children age 12–17 years are most likely to use the internet for school work and exam revision sites
- Technology is used to maintain friendships with geographically distant peers or family members

3.1.3 Key messages: Attitudes within the home/family

- Parents are generally positive towards schooling but this less so in lower low SE homes
- The majority of parents have a positive view of technology for learning
- Common parental concerns are the dangers of online activity and overuse of technology
- Parents tend to actively monitor children's activity but differently so across age/gender, and less so in low SE homes
- It is easier for parents to monitor activity in shared communal spaces of the home
- Parents tend to overestimate the extent and impact of monitoring/regulation on children's activities
- Software restrictions rather than parental monitoring may reduce risk more effectively
- Parents appear to express preference for social rather than technical forms of monitoring
- Parents have difficulty mapping formal learning activities and context to the home
- Parents are not keen to adopt a teacher role in the home
- Parents find it difficult to identify adequate resources for learning
- Many parents think they lack skills in the use of technology
- Low SE homes are more likely to see technology as an entertainment device
- People's positive attitude to technology increases with access, experience and frequency of use
- Increased support networks are likely to increase positive attitudes to technology
- Ownership impacts on perceptions and use of technologies
- Joint ownership of technology (i.e. by home and school) increases use for more formal learning
- Ownership of technology by 'home/family' is likely to lead to less focus on formal learning and more diverse use by multiple users

3.1.4 Key messages: family knowledge and skill

- Children are more likely to ask parents to help with homework than fun activities
- Wanting to help their children more effectively can lead parents, especially mothers, to pursue opportunities to improve their skills
- Parents are most likely to help with technical problems on the computer and with using the internet for formal learning and homework
- Parents who do help become closely involved with children's Internet use
- Mothers are the more popular sources of support
- Fathers are most likely to help with technical problems

3.1.5. Key messages: Use and activities

- Games are played by children of all ages
- Older children's Internet use is more varied and its use to contact/network is more important
- The majority of 12-15 year-olds claim to use the internet for schoolwork
- The majority of 12-15 year-olds use social networking sites
- Children from lower SES homes who have home internet access use it just as much as those from higher SES homes
- Home access increases regularity of use and may lead to improved online skills, self-efficacy
- Girls are more likely than boys to use educational software
- Boys tend to use the computer for games, for searching the internet, and programming
- 'Good use' is linked to context and includes connecting learning to real-world scenarios 'Good use' is linked to the development of educational, social and cultural capital

- 'Good use' of technology for education is associated with developing material and activities that stimulate children's interest and promote self-directed learning,
- 'Good use' is associated with relevance for students interests
- Home use of technology tends to prioritise games, entertainment, e-commerce, informal information retrieval and data management
- More pedagogical reflection on the nature of games and game play is needed
- Low SE homes tend to use the internet more for entertainment purposes than for information gathering
- Children tend to reject 'edutainment' as tedious
- Children need to be able to evaluate and use information critically
- Media literacy may be more effective in supporting children's use of technologies than blocking or filtering

3.1. 6 Key messages: Children's autonomy in the home and family

- Boys are likely to have access to the Internet in more places
- Boys are more likely to have Internet access in their bedroom, compared to girls
- Older teens are likely to have more points of access and more private access
- Middle-class children have more access points to the Internet
- The majority of parents do not directly involve themselves in their children's computer use
- Very few youngsters spend time alone on homework
- The location of technology in a child's bedroom reduces opportunities for parental monitoring and homework support
- Children tend to be more responsive to adult help when using ICT in relation to homework
- Parents are more likely to participate in school-related activity in the home connected with ICT
- ICT tends to have a positive impact on the setting and completion of homework
- Parental motivations for controlling learner access are connected to technology being a communal medium in higher income homes
- Technology is perceived as a personalised medium in lower income homes
- Parental concerns changes as children get older, shifting from 'local' to 'global'

3.1.7 Key messages: practical issues

- Technical support in and outside of school is key to sustaining student and parental engagement
- Programme responsibility for maintenance of equipment and provision of access to learning materials provided at a distance needs to be clear to reduce drop-out
- Access to school VLEs must be robust
- Slow or malfunctioning connectivity/downloading is likely to frustrate users
- A successful roll is likely to require strong community links and local partnerships
- 12% of households have no fixed line and 11% of households are mobile-only, this needs considering regarding types of connectivity and access
- One in twenty middle class households is mobile-phone-only
- Nearly one in four working class households rely exclusively on mobile phones for their communications needs
- Consideration needs to be given to home layout, robustness, and parental control over access in relation to the location and use of home technologies
- Wireless connectivity is an option, consideration needs to be given as to whether this is an extra such as a hub, if so where it might be located
- The potentials for use of a Wide Area Network would provide scope for a range of other mobile devices that may already exist in the home

3.2 Context of home use

SIRC (DCSF, 2008) report that **digital media and new technology are important sub-themes within the physical, temporal and social worlds of family life** in contemporary Britain. Other research (Livingstone and Helsper, 2007; Selwyn, 2007; Lee, 2008) has focussed on **social and demographic indicators as a marker of digital inclusion**, arguing that demographic **variables such as age, socio-economic status, education, household composition, gender and geography also have a significant role to play** in relation to learners' effective use of technologies for educational purposes. They further argue, for example, that **parents' general attitudes** to an experience of education and/or technology **impacts on learners' beliefs about the utility and efficacy of technology for learning**.

Kerawalla and Crook (2002), on the other hand, draw attention to the **impact of space, location and parental interest on learners' appropriation of technology** for learning in the home. The **use of shared social spaces, for example, promotes multiple uses** (learning, entertainment, information seeking) and shared access. However, it **may leave a learner competing for available time** slots, there are also implications of noise levels, e.g. in a living area where audio-enabled technologies may compete with the learner or other family members' need/desire for silence. By contrast, **placing technology in the learner's bedroom may generate sibling rivalry**, **contested ownership, reduce social interaction with family and offer fewer opportunities for parental monitoring of inappropriate use or content**.

Some examples of technology mapping with respect to home use of the Internet include work on the developing of community networks (Passey, 2007), the facilitating of social and civic participation (Selwyn, 2007; Bradbrook et al., 2008) and the migration of many government and public services to digital platforms. Research has been undertaken that attempts to make the pedagogical contexts of learning between home and school clearer, easy to access and mutually relevant with a focus on the disparate perspectives of key stakeholders (parents, schools, learners) (Kerawalla and Crook, 2002; Telem and Pinto, 2006; Kerawalla et al., 2007; Unal, 2008). Taking socio-demographic experiences of stakeholders into account, has led to studies of parents' historical experience of education as potential barriers/affordances of children's successful use of technology to support learning, and investigations of cultural influences on technology use, such as ways of interacting and preferences for individualistic or collective approaches to learning, sharing of resources, etc. (Jackson et al., 2006; Venegas, 2006; Bradbrook et al., 2008; Lee, 2008). Other studies have mapped the contexts of knowledge domains, curricula (formal learning), resources, environment (physical, cognitive, etc.) with respect to home and school (Luckin, 2008). The impact of the physical environment on interactions with technology including location (where situated in the home) and infrastructure (how connected, linked) have also been examined (Kerawalla and Crook, 2002; Mawla, 2007).

3.2.2 Networks and communities for learning within the home and outside of school

There are a wide range and variety of networks through which **learning occurs** within and round the home and in out of school contexts. These range from **interactions with family members, extended family, peers and neighbours** to **participation in clubs** and other organisations (Hart, Bober and Pine, 2008). Children's participation in clubs may be online (Hart, Bober and Pine, 2008) or offline (Wikeley et al., 2007). More specifically learning-oriented organisations such as City Learning Centres were perceived to wide access and opportunity in some communities although mobile facilities were easier to access for some family members (mothers) (Passey, 2007).

Some projects have looked at **intergenerational relations using technology** (Aphek, 2000), family and

community networks (Unknown, 2006; Williams, 2006) around school, learning and technology use. Other research projects like that in the village of Wray (Mitchell, Race and Forde, 2005; Taylor et al., 2008) consider ways in which **local community life can be enhanced via a shared mesh network**. A similar mesh network approach was adopted in the Aston 'Computers in the Home' project (Mawla, 2007).

3.3 Access and family roles

3.3.1 Family: composition and demands on access

Porter and Donehu (2006), using the Technology Acceptance Model (TAM), suggest that **cultures (including organisational, ethnic and familial cultures) that value individuality tend to stress freedom, information seeking and nonconformity, motivating innovation, whilst cultures that tend to value the community and collectivist behaviour** and that these trends extend to the use of technologies. The research evidence of home access and use of technology supports this view. For example, in the Computers in the Home Project (Passey, 2005, 2007) a single computer was used by multiple core and extended family members with 945 people using 125 computers installed in homes by the project (7.6 people per computer). By contrast, in the Homework project (Kerawalla et al., 2007), individual ownership of technology by learners was privileged. This differential **perception on shared use and ownership of technologies** in the home is echoed elsewhere in terms of **demands on access, rivalry amongst family members and the impact of shared access on opportunities and potentials for learning**. Luckin et al. (2008) reiterate earlier findings of Kerewalla and Crook (2002) that **the nature of home access can be complex**, that **for most children the PC is a family resource**, resulting in constraints on the amount of time they can spend using it, as well as when they might be able to do this. Kerawalla and Crook (2002) suggest that **where home computers are shared and located in a public space, parental work takes priority over children's use**, with fathers using the PC for work purposes, and children using it for homework rather than fun (see also Livingstone (2001) below).

In an experimental study in which learners sought to obtain a GCSE ICT using the school VLE, students commented that sometimes the **time they set aside for study was taken up by family activities**: 'The only time I can do this course is at the weekends when Mum and Dad want me to join in family activities'(Boulton, 2008). By contrast, **young learners** in the Homework (Kerawalla et al., 2007) project **profited from mobile technology** to carry out tasks in the car and at **whilst waiting for siblings attending clubs**. Livingstone (2001), given a single access point to the Internet, presents a **4 stage prioritization of Internet use as (1) parents' work (2) children's homework (3) information, and (4) entertainment**.

3.3.2 Family roles: gender and technology

In the Computers in the Home project (Passey, 2005), for 125 computers installed in homes, 55 mothers and 88 fathers used these with **fathers being more likely than mothers to use these to support work practices**. Children in the project were empowered to help their parents, with many parents using computers for the first time, with **one father reported to have used spreadsheets and learned how to search the internet with support from his daughters** (Passey, 2007). In the Homework project (Kerawalla et al., 2007), the contextual and supported integration of technology with the school setting, **children's learning and homework practices led to greater involvement of fathers** in supporting learners with homework.

A recent report by Intuitive Media focused on families with existing computer access in the home whose children participated in 'walled-garden' style computer clubs online, Hart et al. (2008) indicated that **mothers are particularly engaged with their homework and formal learning and take an interest**

in their online safety. **Fathers** join in to a lesser extent but **encourage children with the fun aspects and help them with their hobbies**. Most children were supervised by their mothers (44%), followed by father (35%) and siblings (25%) and Mothers (53%) are more likely to help than fathers (47%). **Mothers are more likely than fathers to engage with their children whilst they are using the Internet.** At the same time, it was suggested that **fathers work commitments, or the absence of fathers from the home might be responsible for this discrepancy** and may also explain children's expressed preference for maternal support.

3.3.3 Age as a dimension of access and use of technologies

Older and younger children have less home access than the younger and middle teenagers. **Older teens have** more points of access and **more private access in their bedroom**. Boys and older teens use the internet more frequently than girls and younger children. Most 9–11-year-olds play games, followed by using the internet for school and creative uses such as drawing or story-making, these being less popular among the other age groups. The oldest teens download music, get information for things not related to school and send/receive emails; they are least interested in games. The middle age group (12–17 years) use the internet for school work and exam revision sites, play games and download music (Livingstone and Helsper, 2007).

3.3.4 The international extended family and maintaining network/communication

Luckin at al. (2008) report that young people regard the **use of social networking and other communication tools as important in terms of the ability to maintain friendships with geographically distant peers or family members** – whether "local" or international. Boulos and Wheeler (2007) raise the issue of **increased use of tools like Skype to communicate with family members overseas and outline the potential of these technologies to connect people to kindred communities and so reduce social isolation**, highlighting opportunities for those disadvantaged by age, ability, location, etc. In 2006, a US blogger, Ryan Williams began to coin the set of family friendly Web 2.0 sites and applications as 'Family 2.0'(Williams, 2006). **A positive view of Web 2.0 and social networking tools by families, with appropriate support, can lead to enhanced local parent community development around school networks**[2] (Olsen, 2006; Unknown, 2006).

In a similar but significantly different approach, a recent Danish study of families who are separated (permanently or working away) reports on the **use of blogging software and image uploading to unite and bond family members, resulting in enhanced awareness of family relationships in both adults and children** (Dalsgaard, Skov and Thomassen, 2007).

3.3.5 Children as 'empowered' educators in the home

According to Hart et al.(2008), a **majority of children (80%) help family members**, mainly Mum (59%) and Dad (41%), then siblings, grandparents, other family members and neighbours. Children help their parents with passwords, working with documents (creating, filing, saving, inserting elements), searching for information (seems to be a key area), using peripherals like digital cameras (downloading data), retrieving lost data. Older siblings assist parents in improving computer use which they then use with younger children.

3.4 Attitudes within home/family

[2] www.schoolparentnet.com

3.4.1 How are families oriented towards schooling?

Many parents **generally have a positive attitude towards schooling** (Crozier and Davies, 2007; Passey, 2007), although this is **less likely in some lower SES homes** where parents have a negative experience/attitude towards schooling (Bradbrook et al., 2008).

Most parents, however, **feel there is insufficient two-way traffic between homes and schools** and **would like to be better informed about learning relationships between these contexts** (Kerawalla and Crook, 2002; Telem and Pinto, 2006; Hart, Bober and Pine, 2008).

Many parents do not currently access school websites and those that do often find the information confusing, irrelevant or uninteresting (Unal, 2008) for information. The **research suggests that schools need to be more proactive** in recruiting parents (Telem and Pinto, 2006) through **push technologies** (e.g. use of mobile phones to send text messages) (Bradbrook et al., 2008) and more relevant information **sharing in real-time** (Becta, 2008b2008a).

Parents' attitudes to technology are also influenced by factors such as overall utility of the medium, skills, confidence, knowledge, interest, and relevance to personal and family goals or motivations.

Many parents feel that **technology is a necessary tool for developing children's social and cultural capital** (Lee, 2008). Research suggests that **higher SES homes are more likely to be directly involved in children's technology use in the home, to monitor activity and to influence interests than in lower SES homes** where parents may have a more negative view of education as an institution, regard technology as entertainment and are more likely to locate technology in their children's bedrooms (Livingstone and Bober, 2006; Livingstone and Helsper, 2007; Lee, 2008).

3.4.2 Attitudes to children's home use of technology for learning

Parents on the whole **value** the use of technology for learning (Kong and Lia, 2009), and **welcome** it in the home (Passey, 2007) but despite the best of intentions, **parents have difficulty mapping formal learning contexts** onto the home setting (Kerawalla and Crook, 2002) **and identifying effective educational content** to support home learning (Buckingham, 2006).

Parents are more likely to **help and/or monitor younger children and girls** with learning with technology than boys and older children (Hart, Bober and Pine, 2008). Parents are **not keen on adopting the role of teacher** for more formal learning activities (Kerawalla and Crook, 2002; Boulton, 2008). Reasons **given for this are lack of time, interest, knowledge, confidence, boredom and children's rejection of help offered**.

Parents feel that **children are generally competent in functional skills** but that they **lack critical awareness of appropriate content and effective use of resources for learning** (Kong and Lia, 2009). **Some parents express similar thoughts about their own technology skills** (Hart, Bober and Pine, 2008) and expressed a desire for help to improve in these areas within local communities – through schools, colleges, local networks.

They feel **more positive about bridging these gaps where schools are actively involved in recruiting and supporting parental engagement** in their children's learning **through information-sharing, face-to-face meetings and family support networks** (Telem and Pinto, 2006; Unal, 2008). Some **parents prefer to receive support in the home than having to go elsewhere** (Kong and Lia, 2009).

3.4.3 Safety and emotional constraints leading to decision not to get home access

Parents around the world have common fears about children's Internet use. These revolve around **two key areas – online interactions and social interactions** in the home. Online, parents are concerned about **personal safety** (inappropriate online contact, sharing of personal data, etc) in particular children **accessing inappropriate or disturbing content** (pornography, violence, extremism). Parents are also concerned about **inappropriate use of technologies** (spreading viruses, piracy, spam, addictive use). Offline, parents concerns centre on **equity of access** (e.g. amongst siblings), potential **rivalry, arguments** around constraints and **regulation** (about homework, access, content, activity), as well as wanting their children to engage in a balance of online and offline activities (Livingstone and Bober, 2006; Livingstone, 2007; Kong and Lia, 2009).

Not all parents embrace technology use wholeheartedly. In a high profile case in 2001, parents at Bill Gates' former school reacted strongly against the introduction of compulsory laptops for all students – on the basis of **costs, sustainability, technological determinism and questionable pedagogical value** (Lightfoot, 2001). Others may reject or at least find the use of technology problematic for **religious reasons**, for example, the Amish reject the use of technology and computers within the home **as a means of preserving their social norms** which they see as threatened by external influences available via the Internet (BBC, 2006). Whilst these are an extreme community, it is probably that some individual families operate under similar familial values.

3.4.4 Surveillance and monitoring

It is easier to **monitor/supervise** children's activity when technology is located in a **public space in the home**, however this does generate other issues, such as **competition from parallel activities** in shared spaces in the home (Kerawalla and Crook, 2002; Luckin et al., 2008; Clark et al., 2009).

Parents from low **SES homes are less likely to monitor children's activity** and **more likely to locate technology in a private space** such as a child's bedroom. This is underpinned by these families being **more likely to see technology as an entertainment device** than as a support for learning (Livingstone, 2007) (or as a support for parental work). Livingstone suggests that propensity of working class parents to locate Internet access in the child's bedroom could lead to **less homework support** and **more uses which may be detrimental**. Particularly, as parents monitor not only **to filter out unwanted influences** but also **to facilitate desired values** (Livingstone and Helsper, 2008).

Younger children and girls' Internet use is more likely to be monitored and to take place in a public space than boys and older children (Livingstone and Helsper, 2007).

3.4.5 How to counter the issue/problem of safety

Livingstone and Helsper (2008) outline a set of strategies parents use to counter safety issues, ranging from co-viewing to wholesale restrictions and report that, on average, parents sought to implement 7 or 8 out of 24 **different kinds of mediation, including age, gender and SES**. Mitchell et al. (2003) found that **software restrictions rather than parental monitoring reduced risks**. Kerawalla and Crook (2002) suggest making **access complementary with family routines**, sanctioning recreational choices and monitoring amount of time spent online.

In the CiTH (Pain, 2008) project, home access was **routed through a community specific network** with access to **filters** and direct access to school networks in a **"walled garden"** approach. Kong and Lia (2009) point to **schools as hubs for parental training on appropriate technology use**.

Livingstone and Helsper (2008) identified four key factors in parental risk avoidance in the home: **active co-use, interaction restrictions, technical restrictions, and monitoring**. *Co-use* relates to shared and interpretive viewing; ***interaction restrictions*** occur during co-present activity through parent-child talk or conversation but also relate to parental restrictions on use and access; ***technical restrictions*** relate to filtering, blocking activity on the part of parents; and ***monitoring*** relates to co-present and post-activity review of children's technology use which may be overt or covert (checking history, emails, etc.), although **issues of trust and privacy** of children are raised in relation to the latter. Parental knowledge and skill impacted on levels and types of monitoring, with more skilled parents applying more regulation and more technical restrictions. In general, **parents exhibit a preference for social over technical forms of mediation**, preferring active co-use over technical restrictions, interaction restrictions, and monitoring practices. (Livingstone and Helsper, 2008)

Perceptions play a large role in dealing with risks – and parents will often measure risk against their knowledge of their children or of their own experience/knowledge of the online world. Evidence from research suggests that there is **a mismatch between parental and children's view of constraints** and limitations implemented by parents, with **parents overestimating** the degree to which they regulate use. (Livingstone and Helsper, 2008).

3.4.6 What changes people's attitudes to technologies?

Evidence from the research suggests a range of different things that change people's attitudes to technologies. Increased **access, experience and frequency of use** can reduce a negative attitude to technology (Livingstone and Helsper, 2007; Bradbrook et al., 2008). Showing how technology is **relevant to learning, providing opportunities for use, and mapping use to perceived needs and available resources** all contribute to changing attitudes to technology (Lightfoot, 2001; Kerawalla et al., 2007; Selwyn, 2007). Embedding the use of the Internet in **social and cultural traditions and capital** is also effective in realising the potentials for technologies (Jackson et al., 2006; Lee, 2008). The provision of good **support networks** (Pain, 2008), **technical and social infrastructures** (Mawla, 2007; Boulton, 2008) and **sustainability** (costs, knowledge, skills, updating) also impact positively on people's attitudes to technology (Bradbrook et al., 2008).

3.4.7 Technology and ownership

In the Homework project (Kerawalla et al., 2007) children were given a tablet PC to use at home and at school. The design of software and the sharing of information between home and school, parents and children around learning activities **facilitated personalisation that was uniquely individual to the learner**, including a learning history. In addition **learners took personal ownership of their devices, leading to higher levels of motivated use**. Similar findings regarding ownership were found in the REAL project[3] where learners were given PDAs to use at home, with a focus on reading, using eBooks (Passey, 2007). In both cases, the **cross-contextual relationship framing the learner's learning context between home and school enhanced parental engagement in the learning process**. Conversely, **ownership of the device by the learner reduced perception of the technology as a family resource**.

Where "joint" ownership of this type exists, i.e. where the technology is loaned or leased by a school, the **technologies appear to be used more for formal learning**, are associated more with the child as a learner and **maintain a 'visible' connection with the school setting**. See also the recent moves to embed the use of miniBooks in schools by supplying all students with a miniBook of their own (Curtis, 2008; Cole, 2009) for use at home for homework, coursework, Internet access, and in place of ICT

[3] http://www.bgfl.org/bgfl/22.cfm?s=22&m=1755&p=533,index&zs=n

suites in school and as cross-phase networking/teaching tools between primary and secondary. **Ownership** is said to **increase motivation, promote home-school learning, and increase learner's self-esteem through trust networks and increases achievement** through technology access (RM, 2008).

Where ownership of home **technology is perceived as a family or household resource, use is less focused on formal learning and more likely to be aligned to multiple uses and users** (Kerawalla and Crook, 2002; Passey, 2007). This enables the technology to be used as a multifunctional, multidimensional device but reduces its immediate impact as a support for learning, and more school-mediated support is required to facilitate this kind of use (Kong and Lia, 2009).

3.5 Family knowledge and skills

Children are more likely to ask parents to help with homework (77%) than fun activities (42%) (Hart, Bober and Pine, 2008). OfCom (2008) found that children (8-17) are more likely to use the internet for instant messaging than email, to have a social networking site (49%) than their parents (15%) and to use search engines to navigate the web (85% of 8-11s and 95% of 12-15 year olds).

Wanting to help their children more effectively can lead parents, especially mothers, to pursue opportunities to improve their skills. Suggestions for ways of doing this have been posited as: doing a computer course online or at the local college, using school facilities, or watching a TV programme that helps parents understand the Internet better (Hart, Bober and Pine, 2008).

Parents are most likely to help with technical problems on the computer and with using the internet for formal learning and homework. Some children (36%) said that parents get annoyed with them for asking for help. **Parents who do help become closely involved with children's internet use** – 83% check activities, 75% explain, 72% answer questions, 61% discuss activities, 59% praised or encouraged their children and 52% checked their child's computer history. **Mothers (50%) were more popular sources of support than fathers** (22%). 84% of children wanted more parental help and 52% said it would be helpful if their parents knew more about computers and the Internet. (Hart, Bober and Pine, 2008).

Dad is more likely to help with technical problems (60%) than mum (49%). The types of skills parents shared with children are wide ranging. These include technical processing skills such as using the Internet (effectively, appropriately, safely), technical skills (keyboard shortcuts, passwords and logons, connectivity, keyboard skills – typing faster, properly, touch typing, printing, using memory sticks), and software skills (Word, PowerPoint, Excel, Paint). They also include academic skills (spelling), and processes of finding information effectively (Google, YouTube, images as well as text, use of key words). Parents have comments on their wanting access to computer courses, and to learn more about technical issues and to develop information literacies (Hart, Bober and Pine, 2008).

Children's perceptions of parental support are framed around skills and activity, including typing, using presentations, spreadsheets, and programmes like Word or Paint, email, playing games and downloading and uploading content, as well as support for homework, school projects school and learning about online safety (Hart, Bober and Pine, 2008).

3.6 Use and activities

3.6.1 Children's use, activities and experiences of home internet access

Children are more likely to use the Internet for instant messaging than for email. **Games were played by all ages** (just under half claimed to use the web for this purpose). Schoolwork/ homework, and

"finding out about areas of interest" were also popular for both 5-7 and 8-11 year olds'. In the **older age group, use was more varied and the Internet's function as a tool to contact other people became more important** (e.g. instant messaging used by 62%, social networking sites by 54%, email by 43%). A large majority of the older children who used the Internet used search engines as a way to navigate to or discover the websites they use (85% of 8-11s and 95% of 12-15 year olds). 63% of 8-11 year olds (55% in 2006) and **80% of 12-15 year-olds claim to use the internet for schoolwork**, while among 5-7 year-olds, playing online games is the most common activity. **The majority of 12-15 year-olds use social networking sites**, as do one in five of 8-11 year-olds. (OfCom, 2008)

Livingstone and Helsper (2007) report that **children from lower SES homes who have home internet access use it just as much as those from higher SES homes**, potentially reducing disadvantage caused by the use gap. They also suggest that **home access increases regularity of use and leads to improvement of online skills and self-efficacy**.

In a Greek study (Vekiri and Chronakib, 2008) on gender and internet use, **girls were more likely than boys to use educational software** and more **boys than girls used the computer for playing games, for searching the internet, and programming**. **Boys have access to the internet in more places**, are more likely to have it in their bedroom, and use it more compared with girls. (Livingstone and Helsper, 2007).

3.6.2 What is 'good use' for educational purposes?

Evidence emerging from the research suggests that 'good use' is framed by four key principles: ***context, competencies, learning approach*** **and** ***relevance*** where technology is fully integrated into the everyday lives learners (Selwyn, 2007) and not seen as an 'add on' to specific domains such as school.

Context includes such themes as connecting learning to real-world scenarios (Jackson et al., 2006) or everyday knowledge contexts, e.g. linking school-based numeracy with home-based scenarios such as pocket money, shopping, or counting and categorising objects using digital cameras in the home (Kerawalla et al., 2007) or linking Internet research to real world contexts that have meaning for students (Jackson et al., 2006; Krumsvik, 2006). In a study of transformative learning with technologies in UK schools, Pearson and Somekh (2006) exemplify 'good use' as use of video to support German language learning, a real audience for the work.

Competencies include the development of educational, social and cultural capital (Buckingham, 2006; Selwyn, 2007; Lee, 2008) including critical, digital, technological and media literacies (Buckingham, 2006; Krumsvik, 2006; Selwyn, 2007; Kong and Lia, 2009). Added to this is the development of higher order thinking skills, metacognitive awareness (Pearson and Somekh, 2006; Bradbrook et al., 2008), identity formation (Boyd, 2007; Selwyn, 2007; Lee, 2008) and cultural competency.

Learning approaches include ways of working with the Internet (collaborative, participatory, co-operative as well as more traditional modes linked to individual learners). In addition, there is a need for contextualising learning between home and school. Parents in Hong Kong stated that **good technology use for education should involve developing material and activities that stimulate children's interest and promote self-directed learning, sociocultural awareness, and appropriate attitudes to learning** with technologies and mutual responsibility of home and school in framing these (Kong and Lia, 2009). Pearson and Somekh (2006) characterise a transformative learning approach as one where **students are empowered to have control over their learning, to explore the affordances of technologies and pursue playful activities, as well as having the freedom to pursue activities intensively without interruption**.

Relevance, is highlighted as a key issue for 'good' pedagogic use of technologies this includes things like using the technology to do what it is good at and for things that cannot easily be achieved without it, e.g. connecting learning across contexts (Kerawalla et al., 2007). Livingstone (2007) suggests that **a successful approach to promoting effective learning with the Internet is to target children's learning trajectories by age, gender, socio-demographic group and frequency of use**. Allowing learners to target information and use tools which are meaningful to them, such as mobile phones, also enhances performance and motivation, such use is made effective through greater home-school-student dialogue (Hartnell-Young and Heym, 2008).

Dutch research involving adolescents aged 13–18 showed that **those who are more disadvantaged tend to use the Internet more for entertainment purposes than for information gathering** (Peter and Valkenburg, 2006). This finding is echoed by Lee (2008) in her socio-demographic study of Internet use by UK teens. Girls are more likely than boys to use technologies for learning.

There is much debate around the use of games for learning, with some claiming it acts as a powerful stimulus (e.g. Gee, 2004b) for learning whilst others **are more cautious, suggesting that more pedagogical reflection on the nature of games and game play is needed** (Buckingham, 2006; Pelletier and Oliver, 2006; Williamson, 2007). Typical claims are made for improved literacy through reading and/or contributing to game texts, as well as the enhanced development of metacognitive skills through game-based problem-solving and simulations (Jackson et al., 2006; Williamson, 2007), and games design (Becker, 2000) which promotes an understanding of media literacies around genre, narrative, (Jenkins, 2003). More work is needed to establish if and how games can be understood in relation to learning, both formal and informal.

Home use of technology tends to prioritise games, entertainment, fun, leisure, e-commerce, informal information retrieval and data management (travel, clubs, file-sharing, etc) and personal activities (finance, communication) (Livingstone and Helsper, 2007; Hart, Bober and Pine, 2008; OfCom, 2008). Despite parents' best intentions and strong desire to view technology primarily as a support for children's learning (Buckingham, 2006) they often feel defeated in this intention by a lack of knowledge, time and inclination (Kerawalla and Crook, 2002).

3.6.3 Legitimization of activities as educational

Buckingham (2006) draws a distinction between *entertainment* and *education* and the mismatch between parents, policy-makers and producers who seek to engage learners through interactive, multimedia materials and **children who reject these attempts at 'edutainment' as tedious in comparison to the forms and genres of technology produced by popular culture**. He suggests **the need for a *pedagogy* of computer use in the home which addresses the social and cultural contexts of children's computer use**, e.g. how (and by whom) children are introduced to computers, and how parents encourage or regulate their use and identification of the skills and competencies – the cultural and educational capital – that children need in order to use technology creatively and effectively.

A Norwegian study (Krumsvik, 2006) on digital literacies in education raises similar concerns, citing the gap between intentions and reality in technology use for education and identifying the need for a new digital epistemology in school and education, a "third way" within pedagogy, with increased status for digital literacy, challenging the role of the teacher and recognizing ways in which the digital format has impacted on traditional roles and media in particular.

It is difficult for parents to import formal learning contexts into the home (Kerawalla and Crook, 2002; Buckingham, 2006). Key areas for doing so legitimately and successfully are class and community projects or homework, with homework being a key area of accepted legitimacy in the home (Kerawalla

and Crook, 2002; Kerawalla et al., 2007; Passey, 2007).

3.6.4 What parents can/want to do with the technology

Parents who have a history of computer or internet access can use it and can support their children in its use for basic skills such as searching for information, communication, producing digital artefacts (texts, images, etc.) and playing games (Hart, Bober and Pine, 2008). What many parents want is to obtain a better understanding of technical issues, strategies for safety and appropriate use and information literacies (finding, validating, managing and contextualising data sets) (Telem and Pinto, 2006; Hart, Bober and Pine, 2008; Kong and Lia, 2009). Many parents also want to **use technologies to find out about employment, courses, leisure activities, and to network** with other people, schools, communities and organisations (Telem and Pinto, 2006; Passey, 2007; Unal, 2008).

3.6.5 Media literacy

Key descriptors for literacy in the digital era: ***technological, digital, information, critical*** and ***media*** literacies. The first four are dealt with here; media literacy in dealt with below. Roughly, these four might be construed as follows:

Literacy	*Description*	*Focus*
Technological	How do we access, use and understand our technologies	**skills and competencies**
Digital	How do we make sense of communication/activity in digital environments	**spaces**
Information	How can we understand, appropriate and manage information in multiple formats and across multiple locations	**content**
Critical	How do we make sense of our interactions with these new forms of literacy and contextualise them in our everyday lifeworlds	**contexts**

Recent research in literacies and education have tended to focus on technological fluency and technology literacy (Dorr and Besser, 2003; Evans, 2005), digital literacy (Dorr, 2000; Swenson et al., 2005; Hicks, 2006), new media formats (Gee, 2004b; Jewitt, 2006; Erstad, Gilje and de Lange, 2007) and critical literacies (Krumsvik, 2006; Kong and Lia, 2009).

Buckingham (2006) states that **children need to be able to evaluate and use information critically if they are to transform it into knowledge**. Rather than seeing the Web as a neutral source of 'information', students need to be asking questions about the sources of information, the interests of its producers and how it represents the world.

In a recent European-wide study, conducted on behalf of the European Commission (Barcelona, 2007), children were singled out as key participants in 'new media' environments which are seen to converge under the banner of media literacy, shifting from a process of reading, writing and understanding, to one of convergence and navigation. Proposals for media education were brought to the fore and **seven competencies were identified: (1) manage content effectively (2) make informed choices (3) understand (4) critically analyse (5) use creatively (6) evaluate and (7) participate democratically.**

OfCom define media literacy (ML) as: '*the ability to access, understand and create communications in a variety of contexts*' (Buckingham, 2006). At its simplest, ML is regarded as the ability to use a range of media and to understand the information received. At a more advanced level, it is considered to include: higher order thinking skills (questioning, analysing and evaluating information) and critical analysis. Buckingham et al. (2006) suggest that **media literacy may be more effective in supporting children's use of technologies than blocking or filtering**. In this respect, their review of the literature suggested that young people already possess quite high levels of *functional* literacy used to gain access to content and can cope with unwanted or upsetting emotional responses, and make critical judgments about areas such as television violence. However, they argue that less is known about how children interpret, evaluate and respond to other media, including internet content and less is understood about children's creative potential with new media. Buckingham et al. (2006) go on to suggest that individual's media literacy needs depend on the purpose for which they are or will be used and that different social groups may develop and require different forms of media literacy. They also suggest that parents, teachers (both in schools and in informal educational settings) and other agencies such as broadcasters and regulators are potential enablers of media literacy.

3.7 Children's autonomy in the home and family

3.7.1 Physical and emotional autonomy

Boys have access to the Internet in more places, and are more likely to have it in their bedroom, compared with girls. Older teens have more points of access to the Internet, and more private access (e.g. in their bedroom), with points of access becoming de-centred with the common use of wireless modems. **Middle-class children have more access points**, and the most affluent are considerably more likely than the poorest group to have home access, broadband and bedroom access. (Livingstone and Helsper, 2007). By contrast, parental regulation over bedroom access rather than access per se may reverse this trend, with a UKCGO survey indicating that **working class parents are disproportionately likely to locate internet access in the child's bedroom** (21% ABC1, 16% C2DE) (Livingstone, 2007).

Boulton (2008) reports that teenage students studying for a GCSE by distance learning felt upset and aggrieved by parental loss of interest in their activity and suggests that in formal learning, students appeared to expect parents to take on the role of "teacher". In a Greek study (Vekiri and Chronakib, 2008) on computer use in the home, researchers found a positive **correlation between students' motivational beliefs and social support**, with students who felt their parents or peers encouraged them to use computers and supported their efforts to learn felt more confident about their abilities and had more motivation to use computers to support learning. By contrast, in an equivalent UK study, Kerawalla and Crook (2002) report that **72% of parents do not directly involve themselves in their children's computer use** and state that parents felt that their children "would not like it if they were often there when they used a computer".

Many young people spend time at home alone watching TV, playing on their computers and reading, **very few youngsters said that they spend time alone on homework** (Wikeley et al., 2007). It is worth bearing in mind that 'alone' may also refer to 'not in the presence of others' and, in this respect, both Kerawalla and Crook (2002) and Livingstone (2007) suggest that **location of technology in a child's bedroom reduces opportunities for parental monitoring and homework support**.

3.7.2 Relationship to current homework: independent learning at home?

Kerawalla and Crook (2002) point to **homework as a potential bridge between home and school and a link to formalising the home learning setting**. They also indicate that **children were more responsive to adult help when using ICT in relation to homework** and **adults, too, felt this was**

an area where they felt it was appropriate to participate in school-related activity in the home setting. In an experimental study on students following a GCSE ICT (Boulton, 2008) by e-learning, all but three (who switched to an after-school setting) of a group of high-achieving and initially highly-engaged students dropped out of the course, demotivated by lack of support from parents, teachers and school and insufficient opportunities for social interaction with their peers. Livingstone (2007) reports that the most common cause of arguments between parents and children in the home is around homework, more so with boys than girls. Conversely, in the Computers in the Home project (2007) Passey reported a **positive impact on the setting and completion of homework as a result of home access to ICTs**.

3.7.3 Degree/potential for parental control, surveillance, monitoring of ICT use

Livingston (2007) suggests that **parental motivations for controlling learner access is coloured by technology being favoured as a communal medium in higher income homes, in contrast to technology as a personalised medium in lower income homes**. Livingstone further presents parental regulation as evaluative (discussion), unfocused (sharing media time with child) or restrictive (limiting time or access). Degrees and concerns over ICT use are age and gender dependent, and the focus of **parental concerns changes as children get older, shifting from 'local' (in the home and near environs for younger children) to 'global'** (interactions with the outside world and more pernicious forms of danger such as drugs, inappropriate contacts, for older children, etc.). In effect, these appear to mirror children's social development.

3.8 Practical issues

Technical support in and outside of school is key to sustaining student and parental engagement in continuity of learning between home and school (Boulton, 2008). Access to school VLEs is often problematic and must be **robust** (Becta, 2008b) as **slow or malfunctioning connectivity/downloading** frustrates users. Such failures can cause student **drop-out** from online learning activity (Boulton, 2008). In connection with this issue, parents' lack of technical know-how to support learners in the home raises questions as to **responsibility for maintenance of equipment and provision of access** to learning materials provided at a distance.

In the Computers in the Home study in Birmingham (Passey, 2005), a successful roll out was marked by **strong community links and local partnerships** between schools, government, ISPs, the project management team and participants. A partnership with a local ISP saw the **implementation of a local Wide Area Network utilising a *connectivity cloud*** over most of the homes in the area (Mawla, 2007).

The project was rolled out via the Birmingham e-Learning Foundation and after a **successful pilot**, parents agreed to contribute £10 a month for computer, Internet access and technical support (via a dedicated project support team), thereby contributing to a **model of sustainability** (Unknown, 2009).

With increased quality and improved costing on mobile telephony, figures from a 2008 OfCom study (OfCom, 2008) reveal that 12% of households had **no fixed line** (with 11% of households being **mobile-only**) – when **considering types of connectivity and access**, these changes need to be given consideration. These figures have **socio-economic dimensions** also with just one in twenty ABC1 households being mobile-only compared to **nearly one in four DE households who rely exclusively on mobile for their communications needs** which may tie into the fact that pre-pay mobile offers those with less disposable income greater control over their spending (OfCom, 2008). Lower SES users are however, more likely to resist commitment to long-term costs in sustaining services (Porter and Donthu, 2006) and are more likely to use top-up methods (OfCom, 2008) of payment.

In a study of children's computer use between home and school, Kerawalla and Crook (2002) pointed to the import **of home layout, robustness, and parental control over access in relation to the location and use of home technologies**. This suggests that **thought needs to be given to the form of technology device** offered to families, should they be wireless, mobile, fixed, portable, etc. In contrast, Kerawalla et al. outline the affordances of specially adapted Tablet PCs (Kerawalla et al., 2007) and the positive impact the mobility of the device had on parental and learner engagement with the tool, perceptions of ownership and sense of continuity/blurring of boundaries between home and school. It is also possible that ownership by the learner and transportation across contexts places greater emphasis on the use of the device as a tool for learning. Some schools have already begun to allocate miniBooks to students (Cole, 2009).

If **wireless connectivity** is an option, consideration needs to be given as to whether this is **an extra** such as **a hub**, if so **where it might be located** within the home or elsewhere, or whether wireless connectivity will be built into the device itself with a neighbourhood or local receptor as in the Aston Computers in the Home project for example (Mawla, 2007). The advantage of a **Wide Area Network** such as that at Aston also provides scope for use of other mobile devices such as mobile phones, PDAs, etc. whilst learners are on the move, as well as providing scope for use of devices that interact with the internet that may already exist in the home: digital cameras, Bluetooth phones.

SECTION 4 REVIEW OF PEDAGOGICAL FACTORS INFLUENCING EDUCATIONAL OUTCOMES

4.1 Introduction and key messages

This section attends to the literature on the pedagogical factors influencing educational outcomes. It uses the literature to explore what an educational outcome might be, that is the extent to which learning can be viewed as formal or informal, and the role of activities such as gaming within this. A key issue raised in the literature is the changing notion of plagiarism, this together with questions of the personalisation of learning and learner independence are briefly outlined. The character and quality of home school relations are highlighted as central to the educational outcomes of home Internet access, and this issue is explored in relation to information flow, the conditions and resources for good home-school relations such as the provision of resources, and forms of communication. Finally, teacher attitudes to the use of the Internet in school and in setting homework are outlined drawing on a number of international studies.

4.1.1 Key messages: desirable educational outcomes

- The effective use of Internet technologies in the home, has the potential to contribute or support the following outcomes:
    - Educational outcomes:
        - Contribution to improved reading, numeracy, literacy practices
        - Supporting increased motivation and engagement of learners
        - Contribution to the development of higher order thinking skills and critical literacies
    - Potential social outcomes:
        - Increase in the social and educational capital of learners
        - Increased participation in local and global networks
        - Development of collaborative networks of expertise

- Social networking, games and other entertainment applications may support building learners' social capital and informal learning
- The place of games in formal learning is however unclear
- If games are to be used for formal learning pedagogic intervention is needed

4.1.2 Key messages: plagiarism

- Students have a more lax attitude towards digital 'cheating' or plagiarism.
- Pedagogic responses to plagiarism are required in addition to technological ones

4.1.3 Key message: personalising learning

- Personalisation needs to be contextualized in the pedagogy
- Content needs to be organized around the user in customizable ways

4.1.4Key messages: Learner autonomy/independence in school and home

- Levels of parental support are key to learner achievement
- Learner independence may be self or parent regulated
- Homework is most productive when designed to connect with or be directed by individual interests

4. 1.5 Key messages: school-home relations

- Technologies in the home can be used to support information flow between home and school
- School focus on parental involvement can increase parental interaction with children in the home
- VLEs etc. need to be organized and structured to make sense from point of view of families
- There is a need to understand the particular local needs of families and communities
- 'Two-way traffic' between home and school can help to build a positive home-school relationship
- Parental understanding of the pedagogic contexts is likely to enhance parental awareness of and responsibility for learning in the home
- The benefits of home Internet access will be optimised by provision of guidance materials for parents
- Parents may need support in selecting appropriate learning resources
- Interactions that offer a comprehensive and holistic view of learners, with room for dialogue are valued

4.1.6 Key messages: teacher attitudes

- Teachers may assume students know how to use the Internet effectively
- How teachers perceive technology is key to how they use it
- The ethical dilemmas of setting and using Internet based resources for homework are reduced by increased accesss

4.1.7 Key messages: Media literacy

- Media education needs to be embedded in the curriculum
- Learners need to be supported to develop cultural and social capital with Internet technologies
- Need to distinguish between the functionality of the Internet and the practices it is embedded in

4.2 Critical work on what a desirable educational outcome might be

Three types of outcome (which many research papers term as 'capital') may be considered as contributing to a desirable educational outcome: formal educational outcomes, social and cultural outcomes or capital (Buckingham, 2006; Selwyn, 2007).

Potential educational outcomes that are claimed for universal home Internet access if used effectively, include improved reading, numeracy, literacy practices. Another claim for home Internet access is that it can increase motivation and engagement of learners through the appropriate contextualisation of learning between home and school (Jackson et al., 2007; Kerawalla et al., 2007). It is also claimed in the literature that home Internet access can support the development of higher order thinking skills (Johnson, 2007) and critical literacies (Selwyn, 2007; Kong and Lia, 2009). An understanding of learning trajectories online may help teachers to support learner achievements more effectively by targeting appropriately staged activities for different age groups (Livingstone and Helsper, 2007). Home access and effective technology-mediated pedagogies which support home-school learning can aim to increase the social and educational capital of learners (Buckingham, 2006; Bradbrook et al., 2008). New forms of pedagogy may be required to be developed to support the use of the Internet.

Potential social outcomes that are claimed for universal home Internet access, if used effectively focus on the extension of learning beyond school boundaries and current contexts, to increase children's participation in local and global networks, blending of formal, informal and non-formal learning contexts to encourage the notion of a continuum of learning (Kerawalla et al., 2007; CEDEFOP, 2008).

Potential cultural outcomes are also claimed, such as developing collaborative networks of expertise and best practice through online communities (Smith et al., 2008), promoting community-based learning networks (Passey, 2007) and partnerships.

4.2.2 The place of games in learning, leisure and informal learning as a bridge to formal learning

Williamson (2007) discusses the use of games in learning, outlining positive elements such as **motivation, flow, learner engagement** alongside issues such as fit with curriculum, misplaced assumptions that all learners' will find such activities engaging, that learners are *au fait* with game play and require little teacher input. On the contrary, Sandford et al. (2007), point to a **mismatch between teachers' and learners' conceptualisation of 'expertise' in relation to game play for learning** the **ongoing need for teacher intervention, pedagogical structuring around game play and meaningful use** (i.e. links to curricular contexts) are a necessary part of the procedure.

Others have pointed to **management, organisation and craft skills** gained through experiential or accidental learning in leisurely game play, such as simulation games like World of Warcraft (Seely Brown and Thomas, 2006) as having potential to support formal learning and even employment.

4.2.3 Connections between formal and informal learning

Validation of non-formal and informal learning is increasingly seen as a **key to realise lifelong and lifewide learning** and **relates to learning outside of formal education, e.g. at work, in leisure and in the home**. These are seen as **'door-openers' to formal education**, particular aimed at supporting disadvantaged groups. A key element of validating non-formal and informal learning is that it should be **voluntary and *formative*** rather than *summative* where, by contrast, the general aim is to generate a concluding statement about learning achieved to date and is explicitly about the formalisation and certification of learning outcomes rather than to **mark ongoing progress and personal development** (CEDEFOP, 2008). An example of this approach at school level might be the Arts Award[4]. Key

[4] http://www.artsaward.org.uk/

elements are: **learner generated, voluntary participation, contributes to future learning, formative assessment, evidenced often by e-portfolio**.

McKenzie (2000) warns of the risks of **technotainment,** defined as: technology activities heavily laced with entertainment but essentially **lacking in rigor or value**. Technotainment is described as stressing **technology for technology's sake without enhancing student reading, writing and reasoning skills**. McKenzie goes on to provide a matrix[5] for testing whether or not technology-mediated learning lacks rigour.

By contrast, Bradbrook et al. (2008) point to the **importance of ICT to support communication and social networking, games and other entertainment** applications **as a means of building learners' social capital and positive attitudes**, which can then be mobilised around educational outcomes.

For schools and teachers **making learning explicit means rethinking learning as a continuum** within which school-based, formal learning is only a part. Demetriasada et al. (2003) point to **schools as sites of cultural negotiation** and, with a particular focus on technology, point to **teachers' natural inclination to see technology use through school-mediated lenses** with teachers' applying traditional pedagogic strategies rather than hybrid modes which attempt to bring together real-world scenarios and curricular contexts. Buckingham (2006) makes similar commentaries on competing knowledge domains in the school context.

In the Homework project (Kerawalla et al., 2007), **the process of participatory design** of learner's technology use **with teachers, parents and learners** resulted in a more explicit **contextualisation of pedagogic processes which parents were able to draw on and link to real-world contexts.**

4.3 Issues concerning definitions, understanding and monitoring of plagiarism

A US study (Ma, Wan and Lu, 2008) of student attitudes to plagiarism found that **students have a more lax attitude towards digital 'cheating'**, with 33% having copied an Internet document within the last year, and 18% admitting to copying two or more, 53% **thinking such actions were 'no big deal'** and **47% believe teachers paid little or no heed to plagiarism**.

Reasons given by students for committing acts of plagiarism include peer culture, Web sites that facilitate plagiarism, the pressure to achieve, the limited consequences or punishments entailed, and lack of understanding of the concept of plagiarism.

Suggested **solutions** are **teaching students' to understand the concept of plagiarism, using anti-plagiarism software such as *turnitin.com*, punishment, and cultivating an atmosphere of ethical behaviour**. Other solutions are to **involve students in interesting activities**, **teach them how to document sources and provide an understandable definition of plagiarism**.

4.4 Home access and personalizing learning

The ability of learners to port work between home and school offers opportunities for **personalisation** of learning (Kerawalla et al., 2007) but it **needs proper contextualisation in order to succeed** (Bradbrook et al., 2008). Craft et al. (2008) suggest that personalisation of learning **is central to learner motivation** and this means **supporting learners** across physical contexts, including educational organisations, workplace and home, **'anywhere, anytime, and 'just in time'**. Johnson et al. (Johnson, Levine and Smith, 2009), considering new trends and developments in technology use, cite the advent of the **personal web** – fuelled by tools which **aggregate content around the user** in customizable ways

[5] See Appendix 1

that explicitly **support the user's social, formal, learning, and other activities** and this may be something to consider for future home-school learning environments and the use/development of learner e-portfolios, for example.

4.5 Provision of models of effective use of the Internet in schools

Harris (2001) outlines a model for Internet use in the classroom based on genres and activity structures as a model for instructional design of online learning spaces. The model outlines three genres and 18 activity structures for Internet use: **interpersonal exchanges** (keypals, global classrooms, electronic appearances, telementoring, question & answer, impersonations); **information collection & analysis** (information exchanges, database creation, electronic publishing, telefieldtrips, pooled data analysis); and **problem-solving** (information searches, peer feedback activities, parallel problem-solving, sequential creations, telepresent problem-solving, simulations, social action projects). The model is described as purpose-driven according to what activities learners are engaged in when they are online. The 'activity structures' model is designed to generate student action sequences. These include, activity structures concerned with **correspondence, competition, comprehension, collect – share- and - compare, chaining** (described as completing an activity locally, creating records of that activity, then send something on so that the next group can do something similar), **come along** (i.e. shadow others as they travel either physically or cognitively, perhaps communicating briefly in the process) and **collaborate** (i.e. work with remotely located others to realize a common goal).

4.6 Learner autonomy/independence in school and home

Key areas which impact on learner achievement with respect to learner autonomy and technology use at home relate to **levels of parental support** which may have a positive effect (Kerawalla et al., 2007) or a negative effect (Boulton, 2008). Learner autonomy and independence at home may be **self- or parent-regulated**. Autonomy and independence is also impacted on in relation to school's **pedagogic framing of homework**, where **too much structure may de-motivate or cause the learner to struggle**. Research suggests that learning connected to real-world contexts which allows the learner to **negotiate flexible outcomes creatively** (Bradbrook et al., 2008), **motivated by individual or self-directed interests** is most productive (Selwyn, 2007).

4.7 The focus on the individual in the school: collaboration and cooperation

Changing modes of teaching and learning with technologies may require a **rethinking of pedagogical structures** (Buckingham, 2006). **Schools are traditionally focused on individual models of assessment, framed by hierarchical curricular structures**. Technology increasingly offers **opportunities for collaborative, co-operative, self-directed, self-managed and learner generated contexts** (Kerawalla et al., 2007) which point to the **need for new ways of thinking about assessment, modalities, and spaces where the teacher is not the only expert**. Conole (2008), whilst she refers primarily to technology use in HE, has outlined some **useful ways of mapping pedagogies and technologies**.

4.8 School-home relations

4.8.1 Information flow

The DCSF require **mandatory real-time reporting between home and school by 2012** (2010 for secondary schools) (Becta, 2008b2008a). Crozier et al. (2007), however, report that **schools are too often focused on school agendas than those of family and home**, propagating one-way traffic rather than facilitating relevant two-way dialogue. Others point to increased use of **technologies in the home as a means of improving home-school relationships** (Telem and Pinto, 2006; Unal, 2008).

Home-school relations can be improved by increased relevance and tailoring of information, in the form of regular communication that is instant, accessible, and transparent. This marks a shift from summative reporting to formative reporting on children's grades, attendance, and performance. Research studies have shown the potential for greater parental involvement through shared SIMS (Telem and Pinto, 2006). The increased use of technologies (email, text messaging) has been shown to reduce absence, and to help to highlight issues before they become major problems. This technology serves to turn home-school communication into a normative activity and can support a broader shift from parental position as reactive to proactive (Telem and Pinto, 2006; Bradbrook et al., 2008)

4.8.2 Conditions and resources for good home-school relationships

Types of school support for good home-school relationships enhanced by universal Internet access include the **provision of information, courses and workshops** including basic computer skills, Internet – information literacy, and specifically child-related activities – teaching children how to use IT properly, teaching children about learning with IT. **Proactively encouraging parental involvement** via Intranet/VLE, and the **promotion of cyber-ethical guidelines** are also key to supporting good home-school relationships (Kong and Lia, 2009). Schools can provide a valuable route for **communication** with parents and community (Passey, 2007) and **when teachers make parental involvement part of their regular teaching practice, parents increase their interactions with children at home** (Unal, 2008). Added to this, **access to curriculum materials and learning content** from home can enable greater parental involvement. There is however an urgent need for **guidance** to be issued to parents on how they can optimise the benefits of a home PC and Internet access. As noted throughout this review, the work of supporting parents in general is essential as parental support and a **flexible and creative approach** to curriculum materials is needed to create the right context for learning to succeed (Bradbrook et al., 2008).

Developing meaningful home-school relationships is identify with three critical issues for success by Kong and Lia (2009). First, the negotiation of timely, easy to access and relevant **patterns of communication** between school and parents. Second, the **sharing of mutual responsibility**, and establishment of reciprocal support networks between school and parents. Third, supporting the fostering of a **degree of closeness** between parents and children. They further identified a range of criteria for success each of which acknowledge the importance of parental role, and the parent as a stakeholder in their children's learning. These include the responsibility of the school to initiate schools in soliciting parental support, the development of home-school collaboration model that allows for such initiatives to take place, understanding that parents can better understand and identify the practices that are expected of them through parent-school communication and cooperation and the need for schools to assume a leading role, parents should play a supportive role.

In the CiTH project, home access to computers and **school-mediated support networks encouraged parental contact and response** (Passey, 2007) and **improved home-school contacts and interactions** generally. In the Homework project (Kerawalla et al., 2007) strong home-school relations **supported parental understanding of pedagogic contexts and generated a reciprocal everyday contextualisation of formal learning contexts** in the home through specially designed learning platforms (hardware and software). Shared responsibility for learning across contexts **increased parental awareness of children's learning in school**.

Unal (2008) conducted a survey of US teachers and parents to identify their perceptions of what makes for **effective information sharing** via school and/or teacher websites and suggests that **many parents not only want to communicate with schools via technology use but also want to be able to view their children's schoolwork online**. Further, there was a **mismatch between teachers and parents perspectives**, with **teachers focusing on institutional structures** (institution/school, classroom rules,

curriculum and standards, supply list, visitor statistics, guestbook) and **parents focusing on the academic achievement of the child** (online practice tests, academic advising information, administration and school board news and teacher resume).

4.8.3 The relationship between learning in the classroom and at home as two-way traffic

In a recent Israeli study, the importance of the home-school relationship as 'two-way' traffic was endorsed. Parents felt there was **greater, more relevant contact with schools, school personnel and school information systems** than there had been prior to technology supported communication. **A two-way approach facilitated rapid identification and follow-up of issues and in turn this changed parental perceptions of their role.** Indicating that they felt schools were taking a more serious attitude towards their children, **parents felt they had greater control** as a result of fluent reporting, were more aware of child's school situation, **changed their perception of the school from that of 'authoritative institution' to a feeling of shared agency and empowerment**, to have their voice heard. As a result, **sense of distance between home and school was reduced**, responsibility was mutually shared, and **students' behaviour and achievement levels improved**.

Technologies which have been used to facilitate home-school communication were both school-owned, e.g. VLEs, Websites (Unal, 2008), SIMs (Telem and Pinto, 2006), and school-loaned, e.g. Tablet PCs (Kerawalla et al., 2007), miniBooks (Cole, 2009), PDAs (Passey, 2007), and more general technologies that were shared/owned by home and school, e.g. Internet, email, text messaging, SMSs, and use of mobile phones generally (Hartnell-Young and Heym, 2008).The eScience project **connects teachers and learners with external experts** and **promotes use of social software like blogs, Google docs and image management systems like Flickr** to generate **real-world contexts** for science learning (Smith et al., 2008; Underwood and Smith, 2008; Underwood et al., 2008).

In a recent Australian project (DEEWR, 2008), a series of digistories[6] were generated around **innovative practice around digital video, VLEs, digital newsletters, webquests, global citizenship, teacher CPD and building local community relationships** (DEEWR, 2008). Key findings were: appropriate practice rather than best practice (not one size fits all); understanding unique needs of user community; sharing examples; planning, implementing, and evaluating.

There is a **mandatory requirement for VLEs in UK schools by 2010**. Raises many issues for schools, both in terms of teacher CPD, technical support, etc. also raises many issues for parents and home-school relationships. **Use of VLE can support learning across contexts in two key ways: - accessing/sharing resources (e-access) and as part of regular, ongoing learning activities (e-learning).** Each presents a different set of issues: technical and pedagogic. Parents and children may lack knowledge/skills to make effective use/give effective support. Much research done at HE level but **more research is needed at school level** (Becta, 2004; Boulton, 2008; Parr, 2008). Again, **social and cultural contexts have an impact** on ways in which these tools are perceived and used, as expressed in this quote from a Becta discussion forum[7]: *"I was dismayed to see that the VLE organisation and structure had been designed from the point of view of the teachers. I can understand the need for the teachers being able to find things but the structure was very traditional in approach (something teachers would grasp at once but children would have little appreciation of)."* [Mikeslvcf: 23/10/08]

[6] http://cemm.educ.monash.edu.au/Exemplar/HomePage/home.php#%u00a0 for digital examples
[7] http://collaboration.becta.org.uk/message/2112

4.8.4 The design of interactive texts and resources that speak to learning in the home and school

The design of interactive texts and resources that can speak to the context of home and that of school need to **relevant and fit for purpose** (see above quote). Where effective, these resources **can promote positive home-school relations and parental engagement** (Kerawalla et al., 2007). Similar issues apply to online texts and resources as previously applied to educational software and 'edutainment' (Kerawalla and Crook, 2002; Buckingham, 2006). **Attention is also required to bandwidth, and the quality of delivery and compatibility are also issues** for the use of multimedia intensive resources and 3D virtual environments (Craft, Chappell and Twining, 2008). **Badly designed resources** can lead to frustration, de-motivation and **negative perceptions of the utility** of a resource (Porter and Donthu, 2006; Selwyn, 2007).

Family resources typically include **Internet access, including technology 'clubs' online and other individually motivated resources, e.g. blogs, social network profiles, puzzles, quizzes**, **games**, etc. In addition most homes have access to **word processing, spreadsheets, presentation and image manipulation software** (Hart, Bober and Pine, 2008). **Purchased software is more likely to relate to gaming and general entertainment than education** and parents may need support in selecting appropriate learning resources (Kerawalla and Crook, 2002). Learning resources in the home are more likely to be informal or non-formal than formal, except for homework-related activity (Livingstone and Helsper, 2007).

4.8.5 What forms of communication are enabled between home and school?

The research evidence suggests the following communication methods are available forms of communication between home and school: the use of mobile phones is increasing with parents receiving **text or SMS messages** about attendance, events, etc. leading to a potential reduction in truancy and improvement in behaviour (Bradbrook et al., 2008). Other forms of communication include **school websites, VLEs, email**, and **access to SIMs** (Telem and Pinto, 2006; Unal, 2008).

Interactions that offer a **comprehensive, holistic view of the learner** as student *and* child with **dialogue around achievement, behaviour, progress, attendance** are valued by parents(Telem and Pinto, 2006). Universal Internet access can support the **celebration of events at home and school** via an online showcase (Unal, 2008) and reporting of school events. **Sharing materials and commentaries**, e.g. through secure blogging, photo-sharing, video-sharing can support home-school relations. These technologies also have the potential to be used to support the contextualisation of learning across formal and everyday situations (Kerawalla et al., 2007) and to **promote collaboration between learners and experts and peers**, locally and globally (Smith et al., 2008).

Making links through civic (Bradbrook et al., 2008) and voluntary (Selwyn, 2007) participation in out of school contexts is key to facilitating community development of shared interests through the use of technology (Passey, 2007). This serves to facilitate the growth of community-wide (Taylor et al., 2008) and family (Unknown, 2006) learning networks.

Ofcom (2008) report that children are likely to multi-task when using their technologies, perhaps watching television whilst using a laptop, or alternating between mobile phone and computer work, whilst listening to an iPod. They also report that more young people are watching video content online in their bedrooms as opposed to in a shared living space with a television. This convergence of activity online suggests there is scope for new learning pathways to be made between home, school, Internet and learner. How such activities are constructed will, however, require some thought and may involve additional partners such as museums, media content producers, art galleries, scientific organisations, etc.

Teachers and schools are encouraged to think about online learning spaces creatively and flexibly, taking into account the multiple spaces within which they will be accessed (Bradbrook et al., 2008), and not to just 'blindly' operate as they have always done (Demetriadisa et al., 2003 ; Krumsvik, 2006). Fears over the open nature of the Internet and its inherent dangers (Kong and Lia, 2009) may suggest the need for a 'walled garden' approach which may be effected in partnership between parents, schools and ISPs (Mawla, 2007), however, parents may prefer to regulate home use freely, whilst schools may prefer to regulate access to school-based resources.

Use of school VLEs allows learners to freely store and access their school work in one convenient place and may also allow them to have access to some learning resources not otherwise available, e.g. Mathletics (Passey, 2007). Home-school links offer scope for e-learning to take place but further research is needed in this area (Boulton, 2008) to clarify support roles in particular. The blurring of boundaries between social and cultural networks generally, and increased use of the Internet by families for communication, may facilitate future linking of disparate networks for learning purposes, e.g. special interest groups around a community, a theme, a particular project, etc. In all of this, the research evidence suggests that the school may act as a convenient hub (through a VLE or similar portal) for managing and aggregating content and activities. However, it is likely schools would need additional support which may be met from the development of partnership providers (of funding, technical expertise, community networking, etc.) (Passey, 2007; Bradbrook et al., 2008).

4.9 Teacher attitudes, knowledge and use online technologies

A Dutch study reports **many secondary-school teachers tacitly assume that students know how to use the computer, surf the web, and communicate via e-mail** (Kuhlemeier and Hemker, 2007).

A Norwegian study into teacher practices with digital technologies suggests that **activity is more strongly anchored in rhetoric than practice** (Krumsvik, 2006), teachers continue to do what they have always done and, **for many, traditional teaching is more dominant** than technology-mediated practice.

In an Australian study of art teachers' use of technologies, some teachers saw IT primarily as a **tool**, whilst others saw it as **opening up 'new, exciting and progressive forms of expression'**. Some teachers felt **ICT was an important element for students' future career aspirations** in the subject, others said it was motivational **for students, as part of the 'real-world'**. Only one of the teachers mentioned ICT as **a means of exploring critical literacy** (Phelps and Maddison, 2008).

A recent US study suggests that **teachers now routinely assign homework that requires Internet use to complete** (Grunwald Associates, 2007). This is in contrast to **earlier studies where teachers were reluctant to set homework that required the use of ICTs due to some students lacking access in the home** (Comber et al., 2002).

Some teachers make imaginative and varied use of the Internet in their teaching. E-learning has used the Internet as **a support for coursework and GCSEs** (Boulton, 2008). It has been used to **create subject portals and digital learning resources online** (Krumsvik, 2006) and to enable **video production to support learning of German in a real world scenario with twinned schools** (Pearson and Somekh, 2006). **Computer games** have been used to support learning, including: using *Knights of Honor* **to support group skills, decision making, speaking and listening skills, and strategic thinking skills**, or using *The Sims 2* to support **information handling, and French vocabulary and speaking skills**, or the use of *RollerCoaster Tycoon 3* to support **learning about energy, forces and design processes** (Williamson, 2007). The Internet has also been used in the Visual arts in Australian secondary

education for **accessing, organizing and presenting material, supporting student research and subject contextualisation** (Phelps and Maddison, 2008).

ICT benefits depend on appropriate use by trained and committed teachers. In education, teacher training and pedagogy, parental support and a flexible and creative approach to curriculum materials is needed. **New UK teaching standards** in 2007 include the **use of e-learning** by trainee teachers (Bradbrook et al., 2008) with **similar programmes** underway in relation to teacher's digital literacy **in Norway** (Krumsvik, 2006).

In an Australian study, art teachers were very knowledgeable about online resources in their subject area and their relevance for students, **shrinking the gap between local/global, school/real-world – citing access to information on artists, art influences, art galleries, film technologies, etc. not readily available through traditional textbooks**. They spoke of having 'the world at their fingertips' (Phelps and Maddison, 2008).Targeted programmes have been facilitated by governments and schools which **support and develop the skills, knowledge of teachers, parents and children**, usually themed approaches, e.g. around digital literacy, critical literacy, creativity, innovation, **collaborative communities**. Four examples are noted below:

- Hong Kong: Extension of ITinED strategy to home context - Information Literacy Project and (Kong and Lia, 2009)
- UK: Schome – Collaboration in Virtual Worlds for Lifelong Learning (Craft, Chappell and Twining, 2008)
- Norway: Digital challenges of teacher education, incorporating Digital Competency Programme, Culture for Learning Programme, and The Knowledge Promotion Programme (Craft, Chappell and Twining, 2008)
- Australia: Exemplar Schools Study: Using Innovative Learning Technologies in Schools (DEEWR, 2008)

What works according to this research are contextualised approaches that recognise the individual perspectives of stakeholders and stakeholder groups, and lead to cross-contextual **relationship-building, knowledge sharing, collaboration**. Successful projects are described as relevant with **timely support mechanisms** (documentation, training, discussion, dialogue), built on participatory design involving all stakeholders. Successful programmes also require effective partnerships within and across communities of users, policymakers, parents, teachers, experts, funding bodies, community networks, ISPs, etc. (Telem and Pinto, 2006; Passey, 2007; Bradbrook et al., 2008; Kong and Lia, 2009).

4.10 Media literacy

The literature argues that media education, as outlined earlier in section 3.6.5, needs to be embedded into the curriculum and pedagogic strategies (Buckingham, 2006; Selwyn, 2007) to enable learners' to develop a sense of cultural competency (Dorr and Besser, 2003) or cultural capital (Buckingham, 2006). Media literacy addresses wider contexts of genre, narrative, media format, audience, purpose, relevance, validity, etc. into other subject areas of curriculum – this generates a need for new forms of thinking about pedagogy (Buckingham, 2006; Krumsvik, 2006).

Recent research on teacher beliefs about English education (Swenson et al., 2005; Hicks, 2006) provide an extensive dialogue on **non-ICT specialists' views on the use of a wide range of technologies** for learning with a particular focus on **technologies** and **literacies** and their **implications for teaching and learning**. In a move that precedes more recent calls for media literacy in schools, a **distinction is sought between the functionality of tools and the practice of literacy** as a means of making meaning in formal educational contexts.

SECTION 5 DISCUSSION

The literature review supports the implicit rationale underlying HAP, that home access to the Internet *if used effectively*, has the potential to contribute in significant ways to improving educational attainment, increasing children and families social capital (and thus reduce social exclusion), and thereby have an overall impact on social mobility. It is important to reiterate the point made throughout this review that in order for the potential direct and indirect benefits of the programme to be realised this the programme will need to support effective *use* of the Internet for the purposes of learning not simply to enable technical access to the Internet. The programme, while targeted at low socio-economic households with children aged 7-18, is likely with the proviso outlined above to benefit families beyond the intervention target group including those who have already invested in buying Internet access. By removing the strong ethical argument that setting online homework and the use of VLEs excludes those students whose families cannot afford to purchase Internet access, the programme is likely to increase the use of the Internet and online resources by schools and teachers. HAP removes this ethical dilemma by establishing the principle of access for all. The programme, through the lifting of this ethical dilemma and the increased setting on online homework etc, has the potential to provide additional motivation for those families who can afford to purchase Internet access but who have not done so.

This section draws on the literature review to highlight potential hypotheses to inform the next stage of the evaluation. These interpret the evidence of the literature review to identify dimensions and outcomes that it would be useful to test and investigate across the evaluation of the programme in the survey and case studies. These are hypotheses are organised with respect to investigating the following seven critical issues that were generated by the literature review:

- Potential educational benefits of home Internet access
- Potential indirect benefits of home Internet access
- Conditions for enhancing the positive potential of home access to the Internet
- Challenges and barriers to the positive potential of home access to the Internet
- Location of Internet access in the home
- Family roles and use of Internet
- Networks and partnerships

These issues cut across the three areas that structure the literature reviewed in sections two to four. Three criteria were applied to select the hypotheses presented here: 1) their significance to the aims of the programme; 2) the availability of evidence to support the hypothesis; and 3) the potential for it to be realistically measured within the three-year timescale of the evaluation. Where appropriate the hypotheses are further separated into high and lower priority categories for the purpose of the evaluation.

5.2 Assessing the potential benefits of HAP (Home Access Project)

The literature review suggests it would be useful to investigate the following potential benefits of HAP on learning and education more broadly speaking.

5.2.1 Potential educational benefits of home Internet access

The potential educational benefits of home Internet access are wide ranging, including direct educational attainment, styles of working, learner identities and communication, changing attitudes to education, and increasing parental involvement in learning and education. The literature suggests that if effectively used, HAP has the potential to contribute to a positive effect on children's educational attainment outcomes in reading, numeracy and literacy practices, this is however a long term benefit that it is not appropriate to measure in the life of the evaluation.

High priority hypotheses for testing regarding the potential benefits to the learner:

- HAP will support children to work more independently (self-directed, collaborative) at home and school.
- Hap will support increased student motivation and engagement, particularly of disaffected pupils.
- HAP will support children's development of improved social skills.
- HAP will support the development of children's communication skills by expanding their opportunities and involvement in range of communicational forms with a variety of people.
- Hap will enable access to a wide range of sources of information that, with guidance and support, can develop children and families information seeking and evaluation skills.
- HAP will enhance children's repertoires of practice and involvement in digital authoring by expanding their access and engagement with technologies.

Lower priority Hypotheses

- Home Internet access will increase the use of learner e-portfolios and home-school learning environments.
- HAP will support increased opportunities for personalisation of curriculum content.
- HAP is likely to encourage peer-to-peer networking and communities of interest and information sharing.

Hypotheses for testing regarding the potential benefits to the household/family:

- HAP will increase familial interest and awareness of the relevance of technology.
- Increased use of technologies will decrease anxiety and fears of technologies.
- In order for the full benefits of HAP to be realised children and families will need to be supported in developing critical awareness of new technologies and their potentials.

Hypotheses for testing regarding the potential benefits to the school:

- The HAP project will remove a substantial rationale for teachers reluctance (due to ethics of access) to set homework that requires Internet use to complete.
- HAP is likely to support a diversification of the use of digital technologies in the school.

5.2.2 Potential indirect benefits to child, school, community

Home access to the Internet has a number of potential indirect benefits to children, schools and the community in relation to civic participation, uptake of services, and communication within families and communities.

High priority hypotheses for testing

- HAP is likely to increase parental take up of hobbies and literacy, particularly where disadvantaged groups have additional community support networks.
- HAP may support families increased and widened access to public services online, including health, education, and jobs within the community.

Lower priority hypotheses

- HAP will provide new possibilities for contact, sharing, and communication across distances between family members (parents and children), particularly in the context of international extended families, which can reduce social isolation.
- HAP may support higher levels of civic participation online among younger users.
- HAP has some potential to support flexible home working for parents.

5.3 Conditions for enhancing the positive potential of home access to the Internet

The literature review highlights a variety of conditions that may enhance the positive potential of Internet access in the home, these include parental attitudes to technology, school-home relations, and training and support.

Hypotheses for testing

- Strong community links and local partnerships between schools, ISPs, HAP management team and parents/families will be required for a successful roll out of HAP.
- School provision of an effective support network and communication between home and school will have a positive effect on the use of HAP for learning.
- The impact of HAP will be enhanced if parents are given information on, and supported in how to evaluate learning resources and deal with safety concerns.
- To be effective, the structure and design of school VLEs needs to respond to the needs of parents and children as well as teachers.
- On-going technical support will be essential to support effective home use of technologies.
- The more parental support for Internet use in the home the better the range and efficacy of children's Internet use.

5.4 Location of the computer in the home

This section outlines hypotheses concerned with how decisions regarding where the HAP technology is placed within a home may effect how it is used.

- Where the computer is located in a communal space in the home (e.g. the living room) it is more likely to support multiple users and uses and increase intergenerational dialogue and interaction.
- Where the home computer is located in a communal space in the home, parental use is likely to take priority, placing time constraints on when and for how long children can use it.
- Where the home computer is located in a communal space in the home children are more likely to use it for formal learning (homework) rather than informal learning/leisure.
- Lower socio-economic families will be more likely to regard technology as entertainment and locate technologies in their children's bedrooms than are higher SES
- Where the computer is situated in the learner's bedroom social interaction with family (and monitoring of content) is likely to be reduced.

5.5 Family roles and use of Internet

Access to and patterns of use of Internet (and other technologies) for educational purposes within low socio-economic families is affected by age, gender, and household composition. Parents feel that technology is a necessary tool for developing children's social and cultural capital. This section outlines a series of hypotheses on likely patterns of use to be tested.

High priority hypotheses to be tested:

- Older teens have more private access to the Internet than younger children and are therefore more in need of understanding how to evaluate and manage online risk.
- Children aged 12-17 are the most likely to use the Internet for school work and exam revision as well as for games and music.
- Well designed, and supported projects for home-school links on learning are most likely to support fathers' involvement.
- Lower socio-economic families will be less likely than others to be directly involved in children's use of technologies in the home (e.g. to monitor activity), and less likely to influence their children's interests in its use.

Lower priority hypotheses:

- Boys and older teens use the Internet more than girls and younger children.
- Girls' and younger children's use of the Internet is more likely to be monitored by parents than boys and older teens.
- Younger learners (8-11) will spend less time online and engage in a more limited range of activities, than older learners (over 12).
- HAP will enable children to act as educators in the home to their parent(s) and other adults more so than siblings.

5.6 Networks and partnerships

- HAP will provide potentials to improve school-home dialogue and relationships that allow a flow of information and the continuity of learning between home and school.
- Enhanced home-school relationships supported by HAP are likely to increase the time children spend on learning at home.
- Teachers who regularly make parental involvement part of their teaching practice via online homework will increase parental interactions around learning with their children at home.
- The use of 'walled gardens' by schools to regulate access to school-based resources will increase to allay parental fears and concerns re online risk.

- VLEs and home Internet access will increase opportunities for home learning, remote access and e-learning in some circumstances.
- Home Internet access will enable learners to access their school work and a broad range of pedagogically framed resources in one convenient place.
- Home Internet access provides opportunities for schools to build virtual local and global networks with museums, galleries and other organisations.

5.7 Challenges and barriers to the positive potential of home access to the Internet

The literature review identifies several key challenges and barriers that need to be considered within the programme.

- Badly designed VLEs and other online resources will frustrate and demotivate learners and parents and increase their negative perceptions of home Internet access for education.
- The potential economic benefits of HAP are likely to be restricted by low levels of literacy, numeracy and access to credit.
- Parental concerns about dangers of online activities and overuse of technology may inhibit some families' engagement, uptake and use of HAP.
- Parents are likely to find it difficult to map formal learning contexts onto the home setting and identifying effective educational content to support learning.
- Parents are not keen, able, or confident with respect to taking on the role of 'teacher' in formal learning activities and children often reject parents offers of help.

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